November 1983
An independent magazine published by ECC Publications

sinclair user

Only 75p

Issue No 20

FREE BEGINNER BOOKLET

ALCHEMY ON THE SPECTRUM
TRANSFORM YOUR BASIC PROGRAMS

Micronet adaptor taken apart

Running a school with the ZX-81

Ian Logan speaks about the Microdrive

Chinese do deal with Sinclair



BIGGEST EVER ISSUE
164 fact-filled pages

Contents

incorporating Spectrum User

Managing editor
Nigel Clark
Deputy editor
Nicole Segre
Consultant editor
Mike Johnston
Managing production editor
Harold Mayes MBE
Software editor
John Gilbert
Program reviewer
Rebecca Ferguson
Illustrator/designer
Brian King
Group advertisement manager
John Ross
Sales executive
Annette Burrows
Production assistant
Dezi Epaminondou
Managing director
Terry Cartwright
Chairman
Richard Hease

Sinclair User is published monthly by ECC Publications Ltd.

ABC
MEMBER OF THE AUDIT BUREAU OF CIRCULATIONS

Telephone
All departments
01-359 3525

If you would like to contribute to any of the Sinclair User group of publications please send programs, articles or ideas for hardware projects to:
Sinclair User and Programs,
ECC Publications,
196-200 Balls Pond,
London N1 4AQ

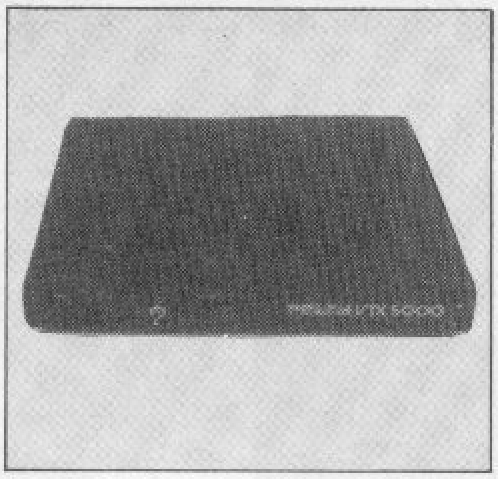
Programs should be on cassette and articles should be typed. We cannot undertake to return them unless a stamped-addressed envelope is included.
We pay £10 for the copyright of each program published and £50 per 1,000 words for each article used.

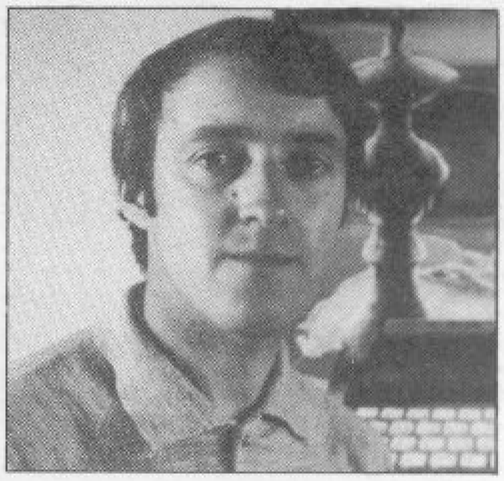
ISSN No 0262-5458

Printed and typeset by
Cradley Print PLC,
Warley,
West Midlands

Distributed by
Spotlight Magazine Distribution Ltd,
1 Benwell Road,
Holloway,
London N7
01-607 6411

Cover Photograph:
Peter Dawney





NEXT MONTH

Stephen Adams reviews communications systems for Sinclair machines. We meet a user who lives in Strasbourg; and there is a special introductory Christmas offer for our growing Sinclair User Club.

"IT LOOKS NICE BUT WHAT THE HELL CAN I DO WITH IT?"

Every ZX SPECTRUM Print'n'Plotter Jotter has 100 pages of finely printed screen grids.

50 for the high resolution screen. 50 for the normal character screen.

With these at your disposal you can plan practically any graphics print-out to program into your computer.

The high-resolution PLOT grid shows every one of the 45,060 pixels! Every one printed. Every one with its co-ordinate numbers. This gives you enormous graphics power to DRAW, PLOT, CIRCLE, PLOT OVER and so on in any position or screen building up graphic drawings, charts, maps . . . in fact anything without the complications of guesswork, integer out of range, or wrongly positioned pixel colours which change PRINTed INK characters!

The normal character PRINT grids on the other hand will allow you to be specific about PRINT AT, TAB, PRINT OVER, SCREEN$ and INK/PAPER in direct co-ordination with PLOT . . . you see every page is printed on **high quality tracing paper** . . . ideal to overlay on to illustrations and 'copy' or co-ordinate.

And there's another bonus, because each page contains 24 User-definable grids — **2400 per pad!**

With 50 pages of PLOT grids, 50 pages of PRINT grids 2400 user-definable grids, a set of colour pens, a printed PIXEL RULER and our Special Offer of demo programs, IT'S THE BEST VALUE IN ZX GRAPHICS PROGRAMMING.



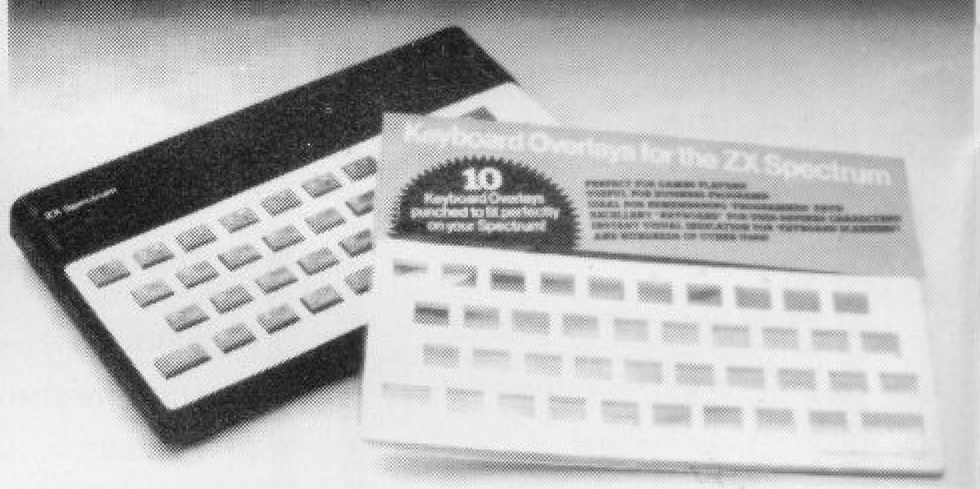
"NOW WHICH KEY DO I PRESS TO SHOOT DOWN THE THING FROM MARS?"

Ever forgotten which key to press when playing a game? Do you suffer from a mind-boggling mass of programmed keys? Do you write programs that use different keys to perform various functions? If so, we have just the thing for your ZX SPECTRUM.

A pack of Print'n'Plotter Keyboard Overlays.

Just write the function or functions under each key you program and keep the overlay for the next time you play the game. Of course there's lots of more uses you will find for our OVERLAYS, user defined characters, keyboard scanners, mathematical programs, business uses — to name just a few.

There's TEN OVERLAYS to a pack — so you can program with impunity! And they fit perfectly onto your standard ZX SPECTRUM KEYBOARD. Each OVERLAY is printed with the cursor movement key directions and there's room for program name etc.



A SPECTRUM CONSOLE THAT EVERYONE CAN AFFORD!

For the cost of a 'games' cassette you can have a truly professional console for your SPECTRUM!

We've cut costs (not cut quality) by designing a self-assembly method using relatively inexpensive materials like strong corrugated board.

The result is a console that's tough, light, highly finished and capable of giving years of useful service.

Facilities include ergonomic keyboard angle, access to rear of machine, choice of P.S.U. internal or external, and alternative of Printer on-board or cassette storage area. Fully illustrated instructions are included.



"PRINTER PAPER THAT WORKS? I DON'T BELIEVE IT!"

Five rolls of our PRINTER PAPER will only cost you £12.50 including postage, packing and VAT! And you'll gain a great deal more! It prints beautifully. It's not too thick. It's not too shiny. Print is black — not grey. It actually feeds through the machine! See for yourself only £12.50 including everything. It's a bargain!



Post today to Print 'n' Plotter Products, 19 Borough High Street, London SE1 9SE or phone: 01-403 6644 (General) or 660 7231 (Credit Card Sales).

Name: ....

Address..

....

....

.... ZX SPECTRUM JOTTER @ £9.95 each
.... ZX SPECTRUM KEYBOARD OVERLAYS @ £2.95 per pack
.... ZX SPECTRUM CONSOLE @ £5.25 each
.... ZX PRINTER PAPER @ £12.50 per five rolls
.... ZX SPECTRUM DEMO CASSETTES @ 95p each
.... ZX81 JOTTER PADS @ £3.50 each
.... ZX81 FILMS @ £2.25 each
.... ZX81 GRAPHICS PROGRAMMING GUIDE @ £1.50 each

Remittance enclosed. Please bill my Access/Barclaycard/Visa/Mastercard No:

Print 'n' Plotter Products

All prices include VAT, P&P. Overseas orders please add 25% for additional surface mail.

SD

"WHERE CAN I GET THEM?"

You can see and buy most of our products at:
W. H. Smith (Computer Stores)
Boots (selected branches)
Buffer Micro (Streatham 01-769 2887)
Microware (Leicester 0533 29023)
Dennys Bookshops (London EC1 01-253 5421)
Personal Computer Services (Darwen Lancs 0254 776677)
Telford Electronics & Computing (Shifnall 0952 460008)
Georges Bookshop (Bristol 0272 276602)
Microtech Systems (Gillingham Kent 0634 571321)
Northampton Home Computer Centre (0604 22539)
Philip Copley Hi Fi (Ossett W. Yorks 0924 272545)
Darlington Computer Shop (Darlington 0325 487478)
Lancashire Micros (Morecambe Lancs 0524 411435)
North East Computers (Peterhead 0779 79900)
Photo-Video (Hereford 0432 267997)
Computers for All (Romford 0708 752862)
March Software (Sawbridgeworth Herts 0279 724341)
Evesham Micro Centre (Worcs 0386 48635)
Computer City (Widnes, Cheshire 051 420 3333)
Landau Electronics (Sutton 01-643 5494)
D&J Computers (Stevenage 0438 65501)
Software Machine (London SE3 01-305 0521)
Screen-Scene (Cheltenham 0242 28979)
Hobbyhorse (Lincoln 0522 35227)
Micro Home Computers (Orkney 0856 3283)

Educational Supplies through Griffin & George Ltd.
Australasian agents: Centrum Systems. Tel: (Perth) 4441031.

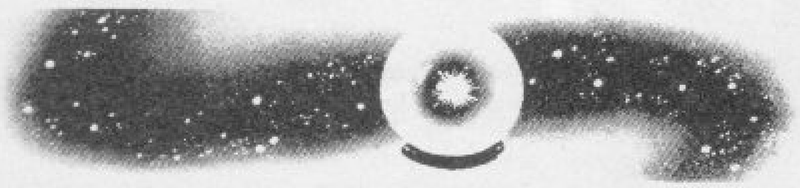
Some micros may die

THERE ARE conflicting reports about the imminent demise of the home computer market. The affairs of Grundy Business Systems, makers of the NewBrain, are in the hands of a receiver. Sales of the Dragon have been less than expected and predictions of profit have not been realised.

It looks a little like the situation in the U.S., where the price war at the cheap end of the market has meant that both Texas Instruments and Atari computer operations are said to be running at a loss and sales of Timex Sinclair machines have been sliding. The T/S problems led Sir Clive Sinclair to state in his chairman's report detailing the annual results of Sinclair Research that it has resulted in "much lower sales volume in money terms than we expected."

Against that must be set the news of increased profits for Sinclair Research. They rose by 65 percent to slightly more than £14 million on turnover which was doubled to £55.5 million, compared to last year. Prism Microproducts, mainly because of its distribution link with Sinclair, recorded turnover of £10 million in its first year. Managing director Bob Denton said the company is moving between £500,000 and £1 million worth of Sinclair goods each week.

In addition, there is the news of the deal for the sale and making of ZX-81s in China which opens vast new possibilities. The fact that the deal was agreed so quickly shows how keen the Chinese must be to take advantage of this new piece of technology and join the computer age. Other business



people who have tried selling in that market must be envious of the speed with which the business was transacted.

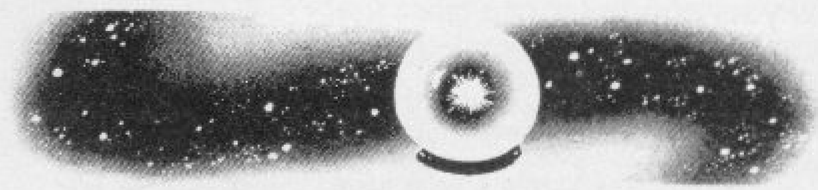
At first sight it would appear that the situation on the other side of the Atlantic is being repeated here, with a few notable exceptions. On closer inspection, however, it is more likely that it exemplifies the differences between the two markets. In the States there is a definite split between the games consoles produced by makers such as Atari and Mattel and home computers like those of Commodore and Texas Instruments.

Sinclair entered that market with its British background of satisfying both areas just as there were moves in the U.S. to link them more closely. The ZX-81, and later the T/S 1000, however, were looked on mainly for their ability in the home business market and their attractiveness rested on their low price. When the competition responded by cutting prices, despite the likelihood of losing money, customers moved to machines with better capabilities.

The troubles in Britain seem to stem mainly from special problems exceptional to the companies involved. Grundy was taking-over a machine which was out-of-date by the time it was launched. What had been a new idea when it was conceived had been overtaken by the Sinclair machines, while its own future was being affected by delays. There is a chance that the NewBrain will survive but the market for which it is intended will have to be re-appraised.

Dragon difficulties appear to be the opposite of those suffered by Sinclair. Instead of under-estimating the market, the company was too optimistic of prospects and budgeted accordingly. It is also likely to be under pressure from its parent, Mettoy the toy maker, which has been looking to Dragon to ensure its future. Last year it had to sell part of Dragon for new finance to enable the company to take advantage of growth prospects in the computer market but Dragon is still its main source of income.

The lesson from both the problem companies seems to be that although there are great opportunities in the home



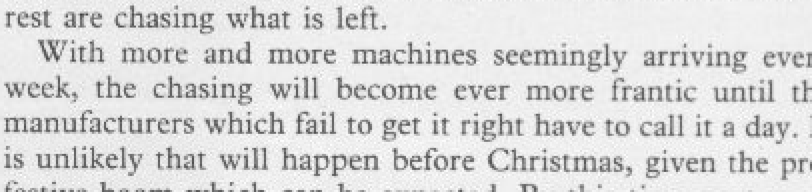
computer market, it is not immune to the normal constraints of business. No-one, not even Sinclair Research, can afford to ignore them, although Sinclair is probably in a better position than most. As it was first into the market, it has had a little more time than others to put itself into good shape, a process which has been proceeding since the company was started four years ago.

That kind of extra time does not exist for the companies which have since started selling home computers. Even the production of a successful machine is no guarantee of business success. Dragon has regularly been one of the top-sellers but that did not prevent it running into difficulties.

As in all businesses, the route to success is to predict demand accurately and adjust supply to meet it. It would appear that demand for home computers is not so easy to predict as some would have believed. With a potential of all the homes in Britain and the sales having reached only about 10 percent of them, it would have been logical to expect that any machines with a reasonable specification and price would sell as fast as they were produced.

Dragon found that was not so. The conclusion to be drawn is that the potential market is not that big, at least not until the price falls to that of a large calculator.

Sinclair experience, however, is that it can sell all its Spectrums, yet the ZX-81, despite its low price, is falling from



favour. That can be rationalised by saying that Sinclair is in a class of its own and has found its niche in the market for a relatively low-cost machine with relatively high specifications. The BBC Model B machine is in a similar situation but the rest are chasing what is left.

With more and more machines seemingly arriving every week, the chasing will become ever more frantic until the manufacturers which fail to get it right have to call it a day. It is unlikely that will happen before Christmas, given the pre-festive boom which can be expected. By this time next year, however, following the fall in sales at the beginning of the year, it could be that many of the less familiar names will no longer be with us.

All of this, of course, would be proved wrong if some company offered a 48K machine with colour, sound and expansion capabilities for less than £10, but is that likely?


BUG-BYTE SOFTWARE
Spectral INVADERS
ZX SPECTRUM SPECTRES
ZX SPECTRUM ASPECT
EDITOR/ASSEMBLER
THE CASTLE
FOR THE ZX SPECTRUM
STYX
FOR THE ZX SPECTRUM (16K OR 48K).
GENERAL ELECTION
FOR THE ZX SPECTRUM (48K)
POOL
ZX 16K SPECTRUM
MANIC MINER
FOR THE 48K ZX SPECTRUM
TOP TEN
Available in all good software stockists. Dealer enquiries contact MATTHEW THOMAS on 051-709 7071
BUG-BYTE SOFTWARE
Mulberry House, Canning Place, Liverpool L1 8JB.

NEW LOW PRICE Series B ONLY £20.50!

Spectrum 16K-48K

With our ME48 memory expansion add-ons your Spectrum can increase its capacity by up to three times.

- ★ no soldering
- ★ easy to fit
- ★ simple to plug in
- ★ fully guaranteed
- ★ no loss of memory through wobble or white out.

NB. Before ordering your Spectrum add-on please check which Spectrum you have in your possession. At the back of the ZX Spectrum the metallic contact strips can be clearly viewed. In the series A the space separating the strips is the same width as the strips. In the series B the strips are twice as wide as the space between.

SPECTRUM
ME16-48 Series A £34.50 plus 60p P + P
Series B £20.50 plus 60p P + P
ME16-80 Series B £46.00 plus 60p P + P

ZX81
ME1-64 £44.25 plus 60p P + P

FITTING/TESTING SERVICE. While you wait, personal callers Monday – Friday 9.30-5.00, £3.00. By return of post £7.00.

NEW

LEVEL-VU PRISM

Allows you to see your tape counter without moving from your seat!

- ★ **attaches easily to recorder body or lid**
- ★ **fits most recorders including Radio Shack, Vic-20, Atari**
- ★ **greatly magnifies counter numerals**

LVP £3.99 plus 40p P + P

COMPUTER STANDS

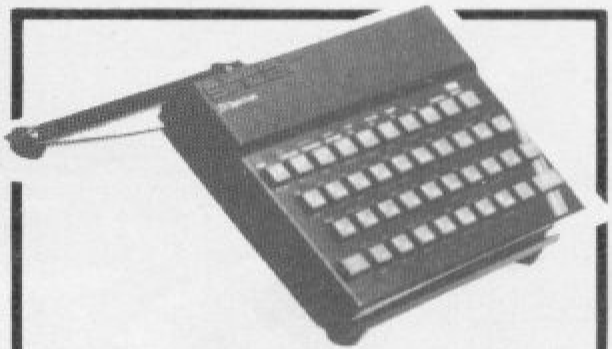
POWER BASE

Raised stand for ZX81 and Spectrum. Fitted LOAD/SAVE switch, and power ON/OFF for screen clearing. Saves wear and tear on connections. Front lip holds computer in place. No soldering, comes complete with all necessary plugs and cables.



Spectrum ref. PBS1 £13.50 plus 95p P + P

ZX81 ref. PBZX81 £13.00 plus 95p P + P



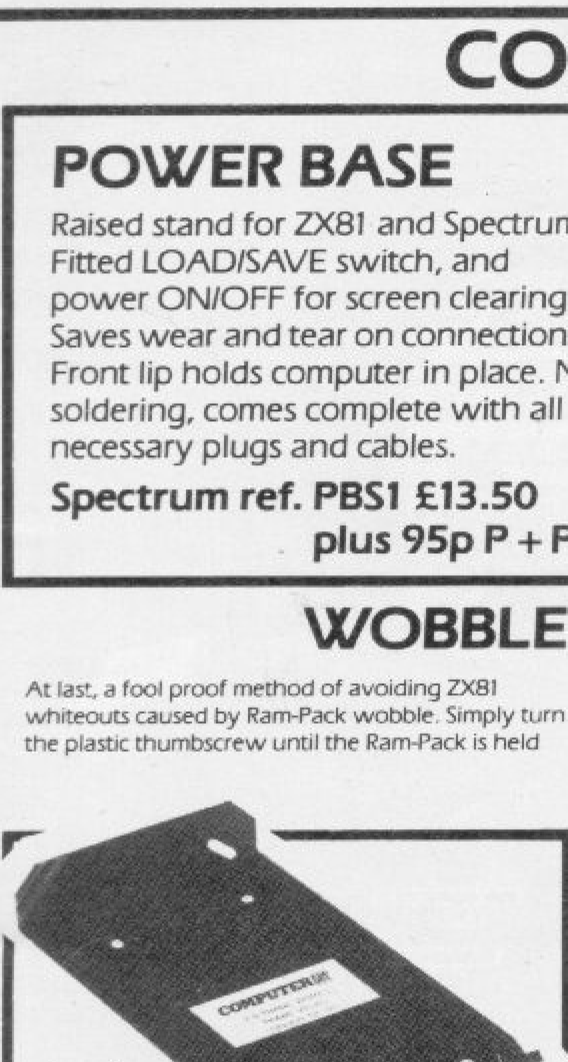
COMPUTILT STAND

Designed to tilt the computer to a better working position. Front lip holds computer in place. Also useful as a document stand when entering information.

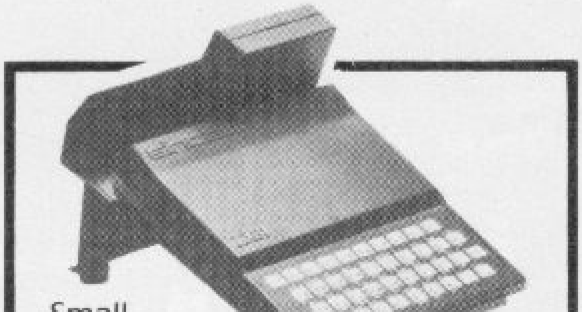
Spectrum or ZX81 ref. CS1 £4.50
plus 60p P + P

WOBBLE STOPPERS

At last, a fool proof method of avoiding ZX81 whiteouts caused by Ram-Pack wobble. Simply turn the plastic thumbscrew until the Ram-Pack is held firmly against the ZX81. No soldering no stick-on pieces, just common sense! Flat or tilted models.



Small flat ZX81 and Ram-Pack ref. SW
plus 60p P + P
£5.25



Small tilted for ZX81 and Ram-Pack ref. STW
plus 60p P + P
£6.25



Large flat or tilted for ZX81 and Ram-Pack and Printer ref.
LW **£5.75** (flat) LTW **£6.75** (tilted) plus 60p P + P

COMPUTER ADD ONS 7-9 Thane Works, Thane Villas, London N.7. Tel: 01-609 7919
Trade enquires welcome

ALL ITEMS NORMALLY DESPATCHED WITHIN 24 HOURS
Please tick appropriate box to order your Computer Add-On. MC1 ☐ MC2 ☐
MC3 ☐ MC4 ☐ MC5 ☐ ME16USA ☐
ME16-48 Series A ☐ Series B ☐ SS1 ☐
TL ☐ ADC12 ☐ ADC15 ☐ ADC20 ☐
ME16-80 Series B ☐ ME1-64 ☐
LVP ☐ PBS1 ☐ PBZX81 ☐ CS1 ☐
SW ☐ STW ☐ LW ☐ LTW ☐

NB. Add Post and Packing to the price of each item.
I enclose a cheque or postal order for ______ made payable/crossed to Computer Add-ons or MicroCare or I would like to pay by Access or Barclay Card and I enter my number and signature accordingly.
*Allow 28 days for delivery.

Signature ______
Date ______

Name ______
Address ______
Occupation ______

SUII/83

COMPUTER ADD-ONS
7-9 Thane Works, Thane Villas London N7

BOOK A TEST FIGHT TODAY!



You'll have a REAL fight on your hands when you tackle our new games.

They're all-action games designed to push your senses to new limits. Take "Brain Damage"; trapped in your computer's micro-circuits you'll need all your resources to defeat the CPU's electron panzers . . . and if they don't get you, the Rogue Programs will.

When you get your breath back you'll be running for your life again in "Exterminator". Transported into the future you'll find that earth is a very different place. Robots rule the world and the human race is almost extinct, there's only one family left. You have to save them . . . but hurry you don't have much time.

Sitting in defense command, your hands poised at the controls, you scan the sky for activity knowing that it will shortly erupt. "Armageddon" is about to begin . . . only YOU can save the last six cities.

If you're still in control of your senses you can try your hand at rescuing the miners trapped on Titan . . . easy you think! Ride your ship through the mini-meteor storm and pick up the men. But you didn't reckon on the corporation spaceships making this "Mission Impossible".

Book your test flight today. Buy any of Silversoft's new games and find out if you're really in control.

To: Silversoft Ltd. London House, 271/273 King St, London W6

Please send me . . . .

. . . .

I enclose a cheque/postal order for: . . . .

Please debit my ACCESS No . . . .

Name . . . .

Address . . . .

. . . .

. . . .

All games run on any ZX-SPECTRUM and cost £5.95, write today for full details of our complete range of software.

Selected titles are available at W.H. SMITHS, BOOTS, JOHN MENZIES, and at all good computer stores.

Special offer games for the ZX-81 and Spectrum

THE SPECIAL offers this month are made up of software with the usual 20 percent off the manufacturers' recommended price. The first three are for the ZX-81 from Micro-Gen. **ZX-Chess** is an old favourite and if you do not have a chess program, this is the one for you. It is a very strong player, even on level one, so there will be plenty of competition with it.

Scramble takes its plot from the original arcade game. You must dodge all the alien craft in the cavern and drop your bombs on to the enemy installations at exactly the right time.

Rescue completes the trio and provides adventure fun on the 16K ZX-81.

The offers for the Spectrum include three games from Imagine. All are arcade games with fantastic graphics and arcade-quality sound.

As usual, all the offers are open only to club members and they will be available until the end of November. To help new members take immediate advantage of the savings this month, they should include their order with their membership applications.

Bi-monthly club cassette available to all club members.
Special discounts on hardware, software and books. Members recover their membership fee many times over.
Free Club software.
Machine code teach-in.
Telephone Helpline.
Technical advice.

CLUB BENEFITS

	Usual price	Offer price
ZX-81		
Mikro Gen		
ZX-Chess	£6.50	£5.20
Scramble	£3.95	£3.16
Rescue	£4.95	£3.95
Spectrum		
Imagine		
Z-Zoom	£5.50	£4.40
Zip Zap	£5.50	£4.40
Arcadia	£5.50	£4.40

Helpline to better loading performance

DIRTY OR WORN HEADS THE MAIN CULPRITS

THIS MONTH we thought we would examine the major areas of difficulty for which our members telephoned the Helpline. Cassette recorders and loading problems seem to be at the head of the list, especially where newcomers to the Club are concerned.

Club investigations have shown that a very small percentage of the difficulties can be attributed to the tapes or the original recording method. Dirty or worn heads are the main culprits of poor loading performance, or the usual azimuth adjustment is set incorrectly.

Azimuth alignment refers to the head being aligned correctly to the tape path through the recorder. The club has a cassette alignment service.

If members are experiencing problems and do not feel qualified to make adjustment, further details are available on request.

There is also a standard Help sheet which should enable members to solve their loading problems.

The Club series on machine code programming seems to have generated great interest and the general level of competence appears to be very high. We are always receiving requests for back issues from members who have joined the club recently and who have become intrigued by the series.

MEMBERSHIP FORM

I wish to join the Sinclair User Club and enclose my subscription of £12

Name ....
Address ....
....
....
....

Which computer do you own?

ZX-81 ☐ Spectrum ☐

Send your coupons to Sinclair User Club, ECC Publications, 196-200 Balls Pond Road, London N1 4AQ. Cheques should be made payable to Sinclair User Club.

Sinclair User Club

Britain

Aylesbury ZX Computer Club: Ken Knight, 22 Mount Street, Aylesbury (5181 or 630867). Meetings: first Wednesday and third Thursday of the month.

Basildon Microcomputer Club: Roger Sims, Wickford 63032, after 6.30pm. Meetings every other week on Tuesdays from 7.30 to 10pm at Healey Management Services, The Hemmels, Laindon, Essex.

Bristol Yate and Sodbury Computer Club: 99 Woodchester Yate, Bristol, BS17 4TX.

Colchester Sinclair User Group: Richard Lown, 102 Prettygate Road, Colchester CO3 4EE.

Crewe and Nantwich Computer Users' Club: J E A Symondson, 46 London Road, Stapeley, Nantwich, Cheshire CW5 7JL.

Doncaster and District Micro Club: John Woods, 60 Dundas Road, Wheatley, Doncaster DN2 4DR; (0302) 29357. Meetings held on second and fourth Wednesday of each month.

Eastwood Town Microcomputer Club: E N Ryan, 15 Queens Square, Eastwood, Nottingham NG16 3BJ.

Edinburgh: Edinburgh Home Computing Club. John Palmer (031 661 3183) or Iain Robertson (031 441 2361).

EZUG-Educational ZX-80–81 Users' Group: Eric Deeson, Highgate School, Birmingham B12 9DS.

Furness Computer Club: R J C Wade, 67 Sands Road, Ulverston, Cumbria (Ulverton 55068). Meets every other week on Wednesday evenings.

Glasgow ZX-80–81 Users' Club: Ian Watt, 107 Greenwood Road, Clarkston, Glasgow G76 7LW (041 638 1241). Meetings: second and fourth Monday of each month.

Gravesend Computer Club: c/o The Extra Tuition Centre, 39 The Terrace, Gravesend, Kent DA12 2BA. Bi-monthly magazine and membership card.

Hassocks ZX Micro User Club, Sussex: Paul King (Hassocks 4530).

Inverclyde ZX-81 Users' Club: Robert Watt, 9 St. John's Road, Gourock, Renfrewshire PA19 1PL (Gourock 39967). Meetings: Every other week on Monday at Greenock Society of the Deaf, Kelly Street, Greenock.

Keighley Computer Club: Colin Price, Redholt, Ingrow, Keighley (603133).

Lambeth Computer Club: Robert Barker, 54 Brixton Road, London SW9 6BS.

Liverpool ZX-Computer Centre: Keith Archer, 17 Sweeting Street, Liverpool 2.

Manchester Sinclair Users' Club: Meets every Wednesday, 7.30pm, at Longsight Library, 519 Stockport Road, Longsight — 061-225 6997 or 061 445 6316.

Merseyside Co-op ZX Users' Group: Keith Driscoll, 53 Melville Road, Bootle, Merseyside L20 6NE; 051-922 3163.

Micro Users' Group: 316 Kingston Road, Ewell, Epsom, Surrey KT19 0SY.

Newcastle (Staffs) Computer Club: Meetings at Newcastle Youth and Adult Centre, Thursday, 7.30 to 10 pm. Further information from R G Martin (0782 62065).

North Hertfordshire Home Computer Club: R Crutchfield, 2 Durham Road, Stevenage; Meetings: first Friday of the month at the Settlement, Nevells Road, Letchworth.

Northern Ireland Sinclair Users' Club: P Gibson, 11 Fitzjames Park, Newtownards, Co Down BT23 4BU.

North London Hobby Computer Club: ZX users' group meets at North London Polytechnic, Holloway Road, London N7 each Monday, 6pm.

Nottingham Microcomputer Club: ZX-80–81 users' group, G E Basford, 9 Holme Close, The Pastures, Woodborough, Nottingham.

Nottingham ZX Spectrum Club: Would like to hear from new members. D Beattie and P Riley, 53 Kingsley Crescent, Sawley, Long Eaton, Nottingham NG10 3DA.

Orpington Computer Club: Roger Pyatt, 23 Arundel Drive, Orpington, Kent (Orpington 20281).

Perth and District Amateur Computer Society: Alastair MacPherson, 154 Oakbank Road, Perth PH1 1HA (29633). Meetings: third Tuesday of each month at Hunters Lodge Motel, Bankfoot.

Regis Amateur Microcomputer Society: R H Wallis, 22 Mallard Crescent, Pagham, Bognor Regis, West Sussex PO21 4UU.

Scunthorpe ZX Club: C P Hazleton, 26 Rilestone Place, Bottesford, Scunthorpe; (0724 63466).

Sheffield: South Yorkshire Personal Computing Group. Enquiries to R Alderton (0742 20571), S Gray (0742 351440), P Sanderson (0742 351895).

Sittingbourne: Anurag Vidyarth (0795 73149). Would be interested to hear from anyone who wants to start a club near the Medway towns.

St Albans: Bi-monthly meetings and a magazine. Details from Adam Slater, 40 Watford Road, St Albans, Herts AL1 2HA. Telephone: 0727 54176.

Stratford-on-Avon ZX Users' Group: Chris Parry, 16 Sackville Close, Stratford-on-Avon, Warwickshire.

Swansea Computer Club: B J Candy, Jr Gorlau, Killay, Swansea (203811).

Swindon ZX Computer Club: Andrew Bartlett, 47 Grosvenor Road, Swindon, Wilts SN1 4LT; (0793) 3077. Monthly meetings and library.

Sutton: Sutton Library Computer Club, D Wilkins, 22 Chestnut Court, Mulgrave Road, Sutton, Surrey SM2 6LR.

West Sussex: Midhurst and District Computer User Group. Enquiries to V Weston (073 081 3876), R Armes (073 081 3279).

Worle Computer Club: S W Rabone, 18 Castle Road, Worle, Weston-super-Mare BS22 9JW (Weston-super-Mare 513068). Meetings: Woodsprings Inn, Worle, on alternate Mondays.

ZX-Aid: Conrad Roe, 25 Cherry Tree Avenue, Walsall WS5 4LH. Please include sae. Meetings twice monthly.

ZX-80/ZX-81 Users' Club: PO Box 159, Kingston-on-Thames. A postal club.

Overseas

Austria: ZX User Club, Thomas Christian, c/o Wissenschaft Forscht e. V., Postfach 141, A1190 Vienna. Meets every first Friday of the month. Telephone 0222-44 32 050 for details.

Belgium: ASBL BDMA Belgium National Sinclair Club; P Glenisson, Rue De l'Epeestraat, 14, 1200 Bruxelles.

Belgium, France and Luxembourg: Club Sinclair, Raymong Betz, 38 Chemin du Moulin 38, B-1328 Ohain, Belgium (322 6537468).

Belgian User Group for Sinclair owners (BUGS); Op de Beeck, Patrick, Drabstraat 144, 2510 Mortsel.

Micro-Europe Club; R Betz, Chemin du Moulin, B1328, Ohain, Belgium. Telephone: CCP 000 0846556–37.

Denmark: Danmarks National ZX-8081 Klub (DNZK), Jens Larson, Skovmosevej 6.4200 Slagelese, post giro 1 46 24 66.

ZZ-Brugergruppen i Danmark, Boks 44, 2650 Hvidovre, Gratis medlemskab og gratis blad til enhver interesseret.

J Niels-Erik Hartmann, OZ-ZX-Radioamator, Bruger Gruppe, Bredgade 25 DK-4900, Nakskov.

East Netherlands: Jonathon Meyer, Van Spaen Straat 22,6524 H.N. Nijmegen; (080 223411).

Germany: ZX-80 Club, a postal club; contact Thomas Jencyzyk. Hameln, Postfach 65 D-3250 Hameln, Germany.

Indonesia: Jakarta ZX-80/81 Users' Club, J S Wijaya, PO Box 20, Jkukg, Jakarta, Utara, Indonesia.

Irish Amateur Computer Club: Martin Stapleton, 48 Seacourt, Clontarf, Dublin 3. (331304).

Italy: Sinclair Club, Vie Molimo Veccho so/F, 40026 Imola, Italy.

Genova Sinclair Club; Vittorio Gioia, Via F Corridoni, 2-1, telephone 010 3125 51.

Micro-Europe: Belgium or Club Paris-Micro, 19 Rue de Tilly, 92700, Colombes, France; associated with Club Micro-Europe.

Republic of Ireland: Irish ZX-8081 Users' Club, 73 Cnoc Crionain, Baile Atha, Cliath 1.

Singapore: Sinclair Users' Group: Eric Mortimer, 1D Wilmer Court, Leonie Hill Road, Singapore.

South Africa: Johannesburg ZX-80–81 Computer Users' Club: S Lucas, c/o Hoechst SA (Pty) Ltd, PO Box 8692, Johannesburg.

Johannesburg ZX Users' Club: Lennert E R Fisher, PO Box 61446, Marshallstown, Johannesburg.

Spain: Club Nacional de Usuarios del ZX-81, Joseph-Oriol Tomas, Avda. de Madrid, No 203 207, 10, 3a esc. A Barcelona-14 Espana. International ZX Spectrum Club: Gabriel Indalecio Cano, Sardana, 4 atrico 2a, San Andres de la Barca, Barcelona. Send international reply coupon. Produces a bi-monthly magazine. Spanish ZX Micro Club: Apartado 181, Alicante (Costa Blanca), Spain.

ZX Club Spain; C Benito PO Box 3253, Madrid, Spain.

Swedish ZX-club: Sinclair Datorklubben, Box 1007, S-122, 22 Enskede, Sweden.

United States: Bay Area ZX-80 User Group, 2660 Las Aromas, Oakland CA94611.—Harvard Group, Bolton Road, Harvard MA 01451: (617 456 3967).



Is your ZX Spectrum making the most of your child's intelligence?



Will your child be taking an 'O' level in Space Invaders? Of course not. That's why Heinemann have *introduced a range of computer games* specially designed to help your child's future.

They're both educational and fun, because as all good teachers will tell you children learn more effectively when they are having fun.

So the beauty of it is, your child will think he's mastering a new game. But you know he's really improving his Maths, or English, or Geography or any one of a range of skills and subjects.



Heinemann have for many years been publishing the books your children are using at school.

Now Heinemann are bringing the same expertise and experience to the development of educational computer games for your children to use at home.

With each of these special educational games, designed for 8-12 year olds, you don't just receive a computer program on a cassette. You also get an absorbing, fully illustrated, 16 page book which is packed with facts and information which extends the program and provides ideas for further exciting and educational activities.

The four programs are:

SPECIAL AGENT

As you chase the enemy agent around Europe, you will need to consult travel timetables, respond to intelligence reports, some in code even, and plan your international route. With only a limited amount of money to spend in tracking him down, careful budgeting and a knowledge of Europe are quickly learnt.



BALLOONING

You are flying high above an unknown landscape in a hot air balloon. Will you have enough fuel to climb over the mountain?

Can you master the principles (and physics) of lighter-than-air flight and land safely, avoiding the hazards? Enjoy exploring the science of such flight as you learn to fly the balloon on a series of adventures.

CAR JOURNEY

How quickly could you drive from Exeter to Glasgow, without getting caught for speeding and without running out of petrol? What is the best route from Dover to Liverpool and how much petrol will you need? Could you manage the necessary calculations and decisions to run a successful delivery service? Travel the roads of Britain and enjoy finding out!

PUNCTUATION PETE

Your program to make the acquisition and practice of language skills a real joy! 'Pete' is your guide through a carefully structured series of passages which need punctuating.

Available direct from Heinemann Educational Books, FREEPOST, 22 Bedford Square, London WC1 3BR at only £9.95 including postage and VAT.

Also available from Boots, Dixons, Menzies, W. H. Smiths and other leading retailers. These games will bring a new and worthwhile dimension to your home computer.

NB Run only on 48K Spectrums.

HEINEMANN FIVE WAYS SOFTWARE

To: Heinemann Educational Books, FREEPOST, 22 Bedford Square, London WC1 3BR. (No stamp needed).

Yes I would like to improve my child's education. Please send me the program(s) indicated at £9.95 each inc. VAT & postage.

Tick box(es):
Special Agent ☐ Ballooning ☐ Car Journey ☐ Punctuation Pete ☐

I enclose a cheque/postal order payable to Heinemann Educational Books Ltd., for £______ Or please debit my Access/ Barclaycard/American Express

aSU11

Card No. ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Signature______

Name (BLOCK CAPITALS PLEASE)______

Address______

Postcode______

Reg in England No. 677944

Prices apply to U.K. only.

See our ad. on page 14

Microdrive selling method is criticised

THERE HAVE been rumours of discontent about the Sinclair Research method of marketing the Microdrive. The company is offering it exclusively by mail order, working in strict sequence through the list of people who bought the Spectrum by mail order last year.

Jeffrey Law bought a Spectrum from a retailer six months ago because of the promise of the Microdrive. He will not be able to obtain one until the full mail order list is satisfied.

"I want to use one for work," he says, "I now will have to wait for a Microdrive longer than people who bought their Spectrum months after I did."

"The system seems unfair to anyone who bought the Spectrum through the retail trade," says Mike Meek, head of the Sinclair User Club. The company disagrees.

"The Spectrum was available solely by mail order from April to November last year," says a Sinclair spokesman, "and it is only fair that people who bought it then before it became widely available should be first served now."

He adds that anyone who bought the Spectrum over the counter can still write to Sinclair Research and ask to be added to the end of the Microdrive mailing list.

It could be several months before Sinclair Research works through the list.

"It depends on the take-up rate," says the spokesman. So far, the response to the Microdrive offer has been very high but demand may tail-off when the eager early birds have been satisfied.

ZX-81 export deal signed with China

SINCLAIR RESEARCH has agreed to supply ZX-81s and Spectrums to the Chinese so that they can develop their own microcomputer industry.

The machines will be shipped to China as kits, where they will be assembled at a factory in Guangzhou, the zone in which production of home computer products will be concentrated.

Prism Microproducts, the Sinclair Research main distributor in the U.K., has also won a contract for a series of exhibitions to help British microcomputer companies which produce hardware and software for Sinclair machines to enter the Chinese market.

The Chinese companies involved, the South China Computer Co and the China Electronics Import and Export Corp, are giving an undisclosed amount for the development of the industry.

The Chinese are taking the subject of computers very seriously and companies such as Sinclair and Prism are keen to help. Richard Hease, chairman of Prism Microproducts, hopes to be able to fund the installation of more than 20,000 microcomputers in Chinese homes on a trial basis next year.

Special computer programs are being written to produce Chinese characters on the machines. They are being developed by the Beijng Software Academy.

Major firm stops trading

KAYDE, a big manufacturer of ZX-81 and Spectrum software and hardware, has been put into liquidation.

The company ceased trading on August 26.

Customers who have replied to Kayde advertisements in *Sinclair User* should contact the advertising department by letter. Alternatively, Kayde can be contacted on 0799 26009.

Flat screens launched

THE SINCLAIR flat-screen pocket television has finally arrived. Following months of speculation about the new leap forward in technology, Sir Clive Sinclair launched his latest product.



Smaller than the average paperback book, the television is thought to be far in advance of other attempts at making a flat screen. It uses a single chip for the circuitry and the cathode ray tube is set at right angles to the screen so that the rays are bent.

The sets will be sold initially by mail order and will cost £79.95. It will be some time before they are readily available and demand is expected to exceed supply. Production of 10,000 models is planned by Christmas. Speaking of the new product, Sir Clive said it is a major breakthrough. "I believe it can achieve for television what the transistor did for radio,' he says.

Too small to be used as a computer monitor, the television set eventually will form the basis of a slightly bigger screen to make a properly-portable computer system. That has been tipped widely as a move upmarket into business machines.

Going for growth

IN ITS FIRST year, Prism Microproducts, the sister company of ECC Publications which publishes *Sinclair User,* has built a turnover of about £10 million on which the pre-tax profit was £234,000.

Most of the turnover is the result of the deal with Sinclair Research giving it exclusive distribution to retailers in Britain of the company's computers and software. Bob Denton, managing director, says that the company is distributing between £500,000 and £1 million worth of Sinclair equipment every week.

Since being set up in June last year the company has expanded into distributing software for other machines, such as the Vic-20 and the BBC Model B. It now provides a rack-jobbing service which was introduced recently into Rumbelows shops and is looking at a revolutionary electronic distribution system.

It is also part of the group which is involved with Micronet 800, the database on Prestel which can be accessed using home computers with a special adapter. Prism sells the adapter and there are now models for the BBC Model B and Spectrum.

Spectrum helps in inner city

UNEMPLOYED people in London's King's Cross area will be able to learn about computers in a newly-converted former butcher's shop. Two 48K Spectrums are taking their place beside sewing machines and other teaching facilities in an informal workshop run by the Centaur Project, a voluntary youth and community venture which aims to alleviate some of the problems of a deprived urban area.

The organisers hope that an interest in computer games will lead workshop members, many of whom have very little formal education, towards more advanced skills, including programming.

Sinclair Research has offered the two machines at a discount and Centaur Project is hoping for similar generosity from software suppliers. The workshop is at 313–5 Caledonian Road, London N1.

Programs programme

CENTRAL Independent Television is inviting youngsters in the Midlands to join the studio audience for a programme on computers. The six-part series, aimed at seven to 16-year-olds, will be recorded in Birmingham on October 16 and 23 and November 2 and 7.

Applicants have to write describing their micros briefly and for what they use them.

There is a chance to win one on the show. Write, saying in which date you are interested, to Geoffrey Negus, Central Independent Television, Central House, Broad Street, Birmingham B1 2JP.

Sinclair profit is more than £14m

SINCLAIR RESEARCH made a profit of £14.03 million in the year to the end of March, an increase of £5.5 million on the £8.55 million of last year and very close to the forecast given when part of the company was sold to institutional investors in February.

Sir Clive Sinclair said of the result: "For a firm only three-and-a-half years old at the time, the figures are encouraging."

Turnover doubled from £27.17 million to £54.53 million, about £1 million for each person employed directly by the company.

Sinclair saw that as "a testament to the standard of people with whom I am so fortunate to work."

Earnings per share were 207 pence against the previous year's 106 pence but a dividend of only one penny is being paid "because the firm is expanding so rapidly that I believe the interests of the shareholders are best served by internal re-investment of the profits."

Sinclair owns 85 percent of Sinclair Research with another 10 percent owned by a group of institutional investors.

Since the company was formed in 1980 it has sold more than one-and-a-half million personal computers throughout the world. In addition it has an agreement with Timex in the U.S. for selling versions of the ZX-81 and Spectrum, for which it receives a royalty.

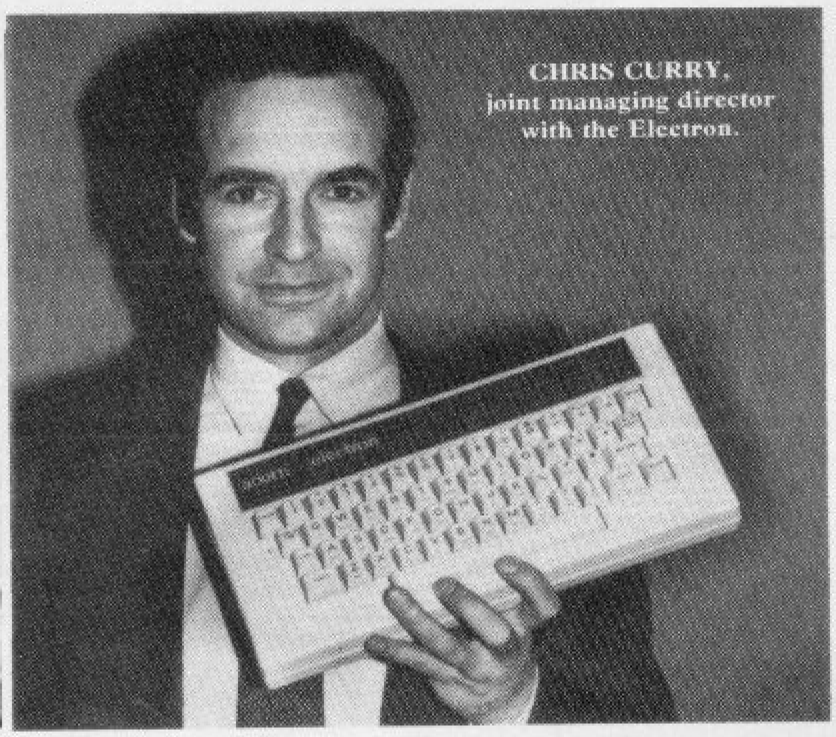
Sinclair said that because of the price war in the U.S., sales in money terms had been much lower than expected. "Fortunately the U.K. market proved better than anticipated, which partly compensated."

For the future, Sinclair said that the company will continue to expand with new products in new areas. One of those areas is the flat-screen television which has been launched recently.

Acorn optimistic at the launch of the Electron

LAUNCHED with a fanfare at the end of August, the latest Acorn product, the Electron, is joining the ZX-81 and the Spectrum, as well as its older brother the BBC micro, on the shelves of 100 branches of W H Smith. It will also be stocked by 300 dealers all over the country.

Selling at £199, the Electron is language-compatible with the BBC and boasts 32K of memory, seven graphic modes, colour and black-and-white TV sockets, and full sound effects. Acornsoft, the Acorn publishing subsidiary, has produced 12 software packages covering games, programming, home education and personal money management.


CHRIS CURRY, joint managing director with the Electron.

"We are confident that the Electron's low-cost, yet BBC-compatible design, will make it an essential part of the home and achieve a prominence equal to that already gained by the BBC micro in the classroom", says Chris Curry, Acorn joint managing director.

The company optimism is reflected in the fact that it aims to produce 100,000 machines by Christmas. Nevertheless, supply is expected to fall short of demand in the early stages and some dealers have already reported waiting lists to around Easter.

Change in ULA hits software

THE ULA change in the model three Spectrum, which was intended originally to combat incompatibilities with Japanese and German television sets, has had unforeseen consequences.

Some people with the new machines are having difficulty loading commercial tapes. The reason is that the machine code IN instruction, which enables tape noise to be read into the computer, has been altered.

"The problem seems to occur when the computer is in graphics mode.

It seems to be a problem with specific, low-distribution tapes and, as far as we know, no Sinclair software or software from our distributors is affected," says Sinclair Research.

Timex Sinclair 1000 sales disappointing

ONE BLOT on the rosy scene of the Sinclair Research financial year was the disappointing performance of the Timex Sinclair 1000 in the U.S. Two factors seem to have affected sales badly, the raging personal computer price war which brought the selling price of the TS 1000 crashing to a derisory $39 and what some believe to have been a marketing error by Timex — the announcement of plans for an upgraded model, the TS 2000, long before it was ready to appear on the market.

In the intervening months, sales of the simpler TS 1000 fell sharply, taking sales of printers and software with them. A Californian distributor reported in August that people were buying one-third as much TS software as they bought for other computers.

Nevertheless, Sinclair Research is not too worried. "It affects us only insofar as royalty payments from Timex have dropped," says a Sinclair Research spokesman. "We are confident the appearance of the TS 1500 and the TS 2000 will help us regain lost ground."

A more handsomely-packaged version of the Spectrum, the TS 2000 is generally agreed to be a winner.

Since its inception in January, prices of other leading computers, such as the Commodore and the Atari, have fallen considerably and it remains to be seen whether the TS 2000 selling price of $200 will prove competitive.

Spectrum Top Ten

	Program	Last Month	Company
1	Flight Simulation	1	Psion
2	Jet Pak	2	Ultimate
3	Mad Martha	3	Mikrogen
4	Horace & The Spiders	6	Melbourne House/Psion
5	Superspy	5	Shepherd
6	Manic Miner	7	Bug-Byte
7	Pssst	—	Ultimate
8	Transylvanian Tower	4	Shepherd
9	Penetrator	—	Melbourne House
10	Ah Diddums	—	Imagine

Compiled by W H Smith.



JUST AROUND THE CORNER, A NEW



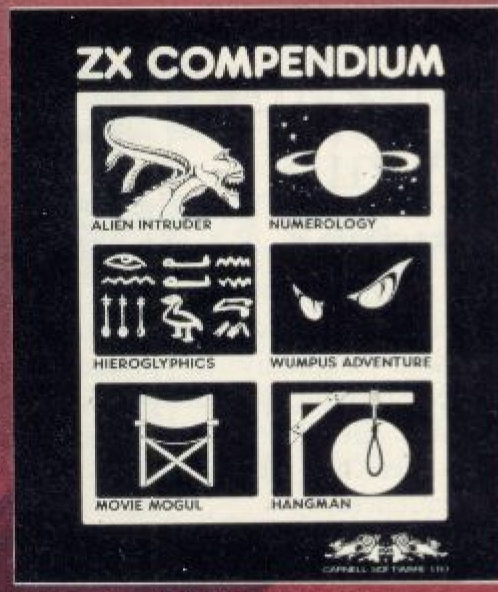
BLACK CRYSTAL

The Classic, six program adventure game for the 48K Spectrum and 16K ZX-81 computers. No software collection is complete without it.

"BLACK CRYSTAL is an excellent graphics adventure and a well thought out package" (Sinclair User, April '83).

"BLACK CRYSTAL has impressed me by its sheer quantity and generally high quality of presentation. I am afraid I have become an addict" (Home Computing Weekly, April '83).

SPECTRUM 48K 180K of program in six parts . . . only £7.50
ZX-81 16K over 100K of program in seven parts . . . only £7.50
Why pay more for less of an adventure?



ZX-81 COMPENDIUM

Alien Intruder, Wumpus Adventure, Numerology, Hangman, Hieroglyphics, Movie Mogul.

The ideal software package for all 16K ZX-81 owners. Six major programmes on two cassettes for only £6.50.

"Alien Intruder/Hieroglyphics — Both programs make good use of graphics and words to make a very entertaining package." (Sinclair User, Aug '82)

"Alien/Hieroglyphics/Wumpus/Movie — A varied mix from Carnell, all featuring imaginative responses and graphics and all of them good games for all ages (Hieroglyphics is particularly good for children)." (Popular Computing Weekly, Aug '82)



THE ADVENTURES OF ST. BERNARD

An exciting, fast moving, machine code, arcade game where you guide your intrepid St. Bernard through the perils of the icy wastelands to rescue his Mistress from the clutches of the abominable snowman. £5.95.



STARFORCE ONE

Take on the robot guardians of the central computer in a superbly stylised three dimensional battle game. £5.95.
(100% MACHINE CODE ARCADE ACTION)



THE CRYPT
written by Stephen Renton

Prepare yourself for the many challenges that shall confront you when you dare to enter "THE CRYPT".

You will battle with giant scorpions, Hell spawn, Craners, Pos-Negs and if you are unlucky enough — the Dark Cyclops in this arcade style adventure.

Available now for the 48K Spectrum @ £4.95



THE DEVIL RIDES IN

I uttered the last incantations as the clock struck thirteen. All fell silent except for a faint rustling in the corner. From out of the shadows they came, all Hell's fury against me but I was not defenceless until the Angel Of Death, astride a winged horse, joined the battle. Avoiding his bolts of hell fire, I took careful aim. My chances were slim, but if my luck held . . . £5.95.
(Fast moving, machine code, all action, Arcade game)

RANGE FROM CARNELL SOFTWARE



AGF MICRODRIVE

PROGRAMMABLE JOYSTICK INTERFACE for Spectrum or ZX81

ONLY 32·95 +£1·00pp

NOW AVAILABLE from SELECTED RETAILERS

PROGRAMMABLE INTERFACE

The AGF Programmable Joystick Interface is a unique design offering the use of any Atari-compatible joystick with absolutely all software, whether it is cassette or ROM cartridge, with the Sinclair Spectrum or ZX81.

The hardware programmable interface requires no additional software and accurately replicates the keys of the computer in a manner which is responsive to absolutely *ALL* key reading methods, both BASIC and Machine Code.

The interface does not interfere with key operation and can therefore be used simultaneously with the keyboard.

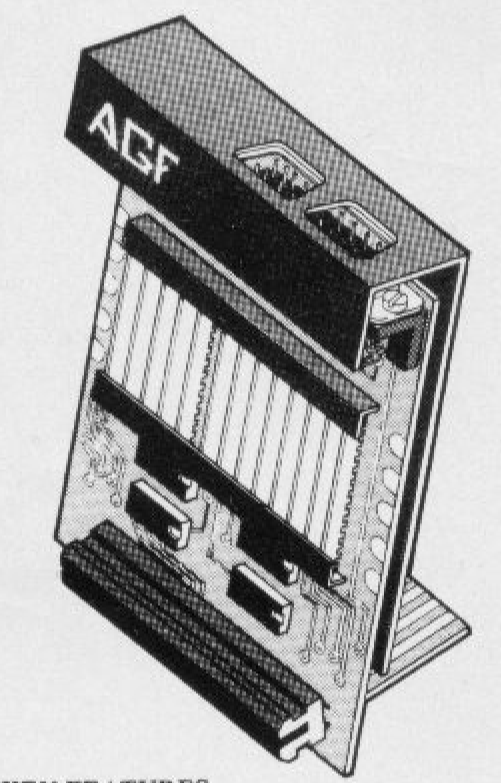
There is no need to remove the interface once fitted as the rear extension connector will accommodate further expansion, i.e printers or RAM packs etc. This important feature avoids excessive wear to the expansion port.

The key replication principle pioneered by AGF means that your own programs can use eight directional joystick movement by utilising simple key reading BASIC.

Two joystick sockets are provided which share the same keys, for use with the majority of two player games. Several interfaces may be used on the same computer for multiple joystick applications.

The interface is programmed by a two digit code, which is looked up on a programming chart supplied, for each direction and firing button. The two numbers are then selected on a pair of leads which are clipped onto appropriately numbered strips on the interface.

Once configured this can be marked on a Quick Reference Programming Card for storing with the game. As the programming is *not* power dependent the interface retains the last configuration made and can be immediately used when next switched on.



KEY FEATURES

- ★ Programmable design gives TOTAL software support.
- ★ Accepts Atari, Competition Pro, Wico, Starfighter, Quick Shot, Le Stick etc.
- ★ Rear extension connector for all other add-ons.
- ★ Free demo program and instructions.

PACKAGE CONTENTS SUPPLIED

- .Programmable Interface Module as illustrated, complete with clip-on programming leads.
- Self adhesive programming chart detailing how to define which key is simulated by UP, DOWN, LEFT, RIGHT, and FIRE. This can be fixed on to the case of your computer or if preferred the protective backing can be left on. The chart is made of a very durable reverse printed plastic and is extremely easy to read.
- One pack of ten Quick Reference Programming Cards for at-a-glance setting to your games requirements. The card allows you to mark the configuration in an easy to read fashion with space to record the software title and company name.
- Video Graffiti demonstration program which is written totally in BASIC to illustrate how all eight directions and fire can be read. This is also a useful high resolution drawing program.
- 12 months guarantee and full written instructions.

JOYSTICKS

CONTROLLERS

FOR USE WITH OUR INTERFACE Module or VIC 20, Commodore 64, Atari VCS, Atari 400, Atari 800

If you require extra Joysticks for our original interface module mark order 'OLD' Joysticks

ONLY £7.54 inc VAT + P&P

PLEASE ALLOW 28 DAYS FOR DELIVERY

ALL ORDERS CONFIRMED

FROM: MR/MRS/MISS

ADDRESS

SEND C.W.O. (NO STAMP NEEDED) TO: A.G.F. HARDWARE, DEPT.**SU**

FREEPOST, BOGNOR REGIS, WEST SUSSEX, PO22 9BR

QTY	ITEM	ITEM PRICE	TOTAL
	PROGRAMMABLE INTERFACE	33.95	
	JOYSTICK(S)	7.54	
	PACK(S) QUICK REFERENCE CARDS	1.00	
ONE	VIDEO GRAFFITI	FREE	
	ZX81 ☐ ZX SPECTRUM ☐ Please tick	FINAL TOTAL	

DEALER ENQUIRIES WELCOME *EXPORT PRICES ON APPLICATION*

COMPATIBILITY

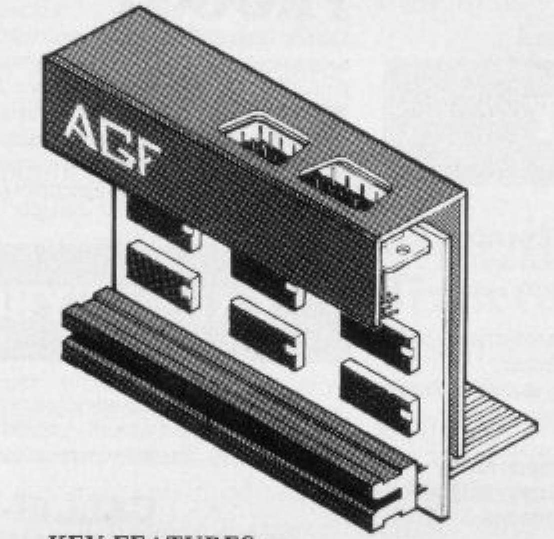
Computer Trade Association Member

JOYSTICK INTERFACE II for Spectrum or ZX81

NEW PRICE

ONLY ~~19.95~~ +£1.00pp

15.95



JOYSTICK INTERFACE

The Interface Module II has been specially designed to plug on to the rear connector of your ZX Spectrum or ZX81 and allow you to connect any standard Atari type digital Joysticks. All of the computer's connections are duplicated on an extension connector so that you can still use any other devices intended for use with your computer.

The Interface Module II resides in the same memory space as the keyboard, which remains fully functional at all times, therefore it will not interfere with anything else connected.

When a suitable joystick is plugged into 'Player 1' socket its action will mimic pressing the cursor keys, up "7", left "5" and so on. The firing button will simulate key ϕ. This unique feature guarantees the best software support.

Take a look at the selection of compatible games we have listed. More are being added all the time as a result of our contact with the various software companies.

A second Joystick may be connected in the 'Player 2' position which simulates in a parallel fashion keys T-Y-U-I-P. This will allow you to play a whole new generation of two player games.

KEY FEATURES

- Proven cursor key simulation for maximum software support
- Accepts Atari, Competition Pro, Wico, Starfighter, Le Stick, etc Joysticks
- Second Joystick facility
- Eight directions programmed in simple BASIC

COMPATIBILITY CASSETTES ☐ £4.95

These cassettes have short programs to load before the chosen game which will convert it to use the cursor keys and therefore become compatible with the Interface Module II.

Cassette One converts:
ARCADIA
SCHIZOIDS
HUNGRY HORACE
HORACE GOES SKIING
SPECTRES
PENETRATOR

NEW!

Cassette Two converts:
CENTIPEDE
PLANETOIDS
JET-PAC
† PSSST
† 3D COMBAT ZONE
† INVADERS

† Will require 48K Memory

JOYSTICKS

CONTROLLERS
FOR USE WITH OUR INTERFACE Module II or VIC 20, Commodore 64, Atari VCS, Atari 400, Atari 800
If you require extra Joysticks for our original interface module mark order 'OLD' Joysticks
ONLY £7.54 inc VAT + P&P

☐ *Available from us*

** State "AGF version"*

JOYSTICK INTERFACE II COMPATIBLE SOFTWARE

ZX SPECTRUM

Abbex	...	*	Spookyman	
		*	Invasion	
		*	Harrier	
		*	Cosmos	
		*	The Android Run	
		*	High Noon	
		*	ETX	
Abersoft	...		Mazeman	
			The Wizards	
			Warriors	
			Spectroid Storm	
Apocolypse Software	...	☐	Galactic Jailbreak	£4.95
Axis	...		Labyrinth	
Blaby	...		Confusion	
			Chopper Rescue	
			Gold Digger	
Campbell Systems	...		Gulpman	
CDS Micro Systems	...		Leapfrog	
C. Tech	...		Specman	
Digital Integration	...		Night Gunner	
			Fighter Pilot	
D.J.L. Software	...		Froggy	
DK 'Tronics	...	☐	3D Tanx	£4.95
			Meteoroids	
Hewson Consultants	...		Nightflite	
			Specvaders	
			Mazechase	
ICL	...		Star Trail (Man.Dock)	
Imagine	...		Zzoom	
Megadodo Software	...		Pheenix	
Micromania	...		Ghost's Revenge	
New Generation Software	...	☐	Escape	£4.95
		☐	3D Tunnel	£5.95
		☐	Knot in 3D	£5.95
Newsoft Products	...		Time Bandits	
			Spectral Maze	
Psion	...		VU–3D	
			Flight Simulation	
Quest	...		Violent Universe	
Quicksilva	...		Meteor Storm	
			Space Intruders	
R + R Software	...		Gnasher	
			Spectipede	
Richard Sheppard	...		Trans. Tower	
Silversoft	...		Ground Attack	
		☐	Cyber Rats	£5.95
Vectis Software	...		Pony Express	
			Vec-Man	

PLEASE ALLOW 28 DAYS FOR DELIVERY

ALL ORDERS CONFIRMED

FROM: MR/MRS/MISS

ADDRESS

SEND C.W.O. (NO STAMP NEEDED) TO: A.G.F. HARDWARE, DEPT.**SU**

FREEPOST, BOGNOR REGIS, WEST SUSSEX, PO22 9BR

QTY	ITEM	ITEM PRICE	TOTAL
	INTERFACE MODULE II	16.95	
	JOYSTICK(S)	7.54	
	SOFTWARE:		
	SOFTWARE:		
ZX81 ☐	ZX SPECTRUM ☐ Please tick	FINAL TOTAL	

DEALER ENQUIRIES WELCOME *EXPORT PRICES ON APPLICATION*

"BY FAR AND AWAY THE BEST MAIL ORDER FIRM FOR SOFTWARE"

(M. PANKHURST, Cranleigh)

SOFTWARE SUPERMARKET

Our catalogue does not have the biggest list of Spectrum programs, just the best. About 50, in fact, covering all fields. (We produce no programs ourselves, so our choice is impartial).

We play all the programs we can find and put just the best of each type into our 24-page catalogue. We quote reviews from *all* the mags and even tell you if your joystick will work!

We choose the best and send them fast. From over 40 countries you praise our same-day despatch. Mail order or phone VISA card orders only please. We're too busy testing programs to run a shop! All goods in stock – and personally tested by us – before a word appears in print!

48K SPECTRUM ONLY

SPLAT! Brilliant, original game from a new company. Guide Zippy through rapidly scrolling mazes, explore, survive, eat grass – and don't get splatted! **£500 HI-SCORE COMPETITION.** Find the Codewords, closes 14/1/84. 7 levels. JOYSTIX: Kempston, AGF. (Incentive) £5.50.

ZZOOM *"Superbly done . . . an outstanding piece of software which is somewhere between a flight simulation and 3D Defender"* (Pers.Comp.News). Fantastic 3D realism as you pilot your ground skimmer to save the refugees from the enemy's planes, tanks, submarines – and Exotron missiles. Raves everywhere. (Imaging) £5.50.

KONG The best Spectrum 'Kong' we've found – it's magic! 4 screens: rolling barrels, fireballs, flying dumbbells, moving lifts – and a pretty girl shrieks "Help!" Demo. Training mode for each screen. Hall of Fame. One of the great games. JOYSTIX: Kempston, Quickshot, Protek. (Ocean) £5.90.

PARAS New full-screen graphic battle game: NOT an arcade or adventure game. You have 15 men to destroy the bridge. Each man has 10 possible actions each turn. 10 skill levels. 2-part game – secure your retreat, then destroy the bridge. (Lothlorien) £5.95.

XADOM *"Excellent 3D graphics . . . very friendly . . . five stars".* (Home:Comp:Wkly). An arcade/adventure combo with great 3D graphics. Explore the alien base to find the "Aartifact" – avoiding the aliens, the traps, the snakes etc. 3 speeds and 3 skill levels. Very good help pages and instructions. (Quicksilva) £6.95.

MANIC MINER *"One of the best Spectrum releases this year".* (Pop:Comp:Wkly) *"The graphics and sound are both superb".* (Pers:Comp:News) Based on the USA arcade chart-topper 'Miner 2049'er': great music, superb graphics as you search through 20 screens – each one a different arcade game. Amazing! 20-screen demo mode. JOYSTIX: Kempston. (Bug-Byte) £5.95.

THE HOBBIT *"Superior to any other adventure game available".* (Yr Comp) *"Takes first place . . . for quality and value for money".* (S. User) THE Spectrum adventure of 1983. Free 285-page illustrated book with clues: unique real-time adventure: 80 locations, 30 beautiful full-screen pictures: 500-word vocab: 16-page manual: 40K of program to 4 people 18 months to write! (Melbourne) £14.95.

PIMANIA *"The best adventure game we have reviewed".* (S. User) *This game can damage your brain".* (Pers:Comp:Games) At press-date, you can still win the £6,000 Golden Sundial by solving this wonderfully witty adventure! Brilliant use of music and graphics really shows off your Spectrum. (Automata) £10.00.

BLACK CRYSTAL *"Excellent graphics adventure".* (S. User). 180K of program loads from 2 cassettes in 6 chapters. Solve each of the 6 stages to defeat the Lords of Chaos. Real-time monster battles: 16 command keys. Illustrated manual. (Carnell) £7.50.

ANY SPECTRUM

PHEENIX BRAND NEW – THE BEST SPECTRUM 'PHOENIX' YET! A full arcade-action 5 screens. 5 skill levels. Choice of 2 character sets. Demo mode. 100% machine-code for smooth animation of the multi-coloured flappers and their hatching eggs. Crams 48K quality into 16K. JOYSTIX: Kempston: AGF (Megadodo) £5.50.

3D SPACE WARS Brilliant 3D space battle. Demo mode: good, clear screen display of instruments: cockpit view fills 2/3rds of screen. Long-range scanner is actually legible! Re-fuelling in space is great. Defeat the 3D SEIDDAB (geddit?). Great space-flight simulation from a company famous for earthflight simulations! JOYSTIX: Kempston: AFG (Hewson) £5.95.

ARCADE SAMPLER Three machine-code classic greats on one tape! INVADERS – one of the fastest ever – 3 speeds, 7 rows of invaders, saucer, shield, 5 bases! SCRAMBLE with 8-way movement, good graphics, and a very fast program. HIGH NOON, the great shootout. For 1 or 2 players. 3 skill levels, nice smooth graphics. (Work Force) £6.50.

POOL The very best Spectrum Pool we've ever seen. Beautiful full-screen table: 1 or 2 players: on-screen frame, balls left, shots, speed select, direction, score, hi-score. Sensational graphics and great sound. (CDS) £5.95.

JET-PAC *"A classic which should rank with Space Invaders and Pacman".* (Pers:Comp:News) *The graphics are superb".* (C&VG) The fantastic game that blasted Ultimate to fame. Control your test-pilot spaceman as he builds his rocket, fuels it up, explores galaxies. 1 or 2 players. As good as its rave reviews. JOYSTIX; Kempston: Quickshot. (Ultimate) £5.50.

FROGGY *"The game is superb"* (ZX Comp) *"Unreservedly recommended . . . a stunning display".* (Home Comp:Wkly) This frogger is leaps ahead of the rest! Loads in 2 parts: instructions and keyboard demo first, then the game – which uses so much memory you even have to unplug your printer! A classic game, in its very best form. JOYSTIX: Kempston: Quickshot (DJL) £5.95.

E.T.X. *"Must be at the limit of the Spectrum's capabilities . . . graphics are excellent and animation superb".* (Home Comp:Wkly) Enchanting adventure: 16 full-screen scenes: 1400 power zones: 4 skill levels. And, in 48K, ETX speakes to you as well! JOYSTIX: Kempston: AGF: Quickshot (Abbes) £5.95.

FREE KEYBOARD OVERLAYS!

If you order from this advertisement comes to £25 or more *(excluding* p&p) we will send you a set of ten of our specially printed keyboard overlays. (If you would like to buy them, they cost £2.50 a set). These overlays will help you get the most from the complex new games!

CALL 01-789 8546 (24 hours)
CHARGE PROGRAMS TO ANY VISA CARD
FREE ZX81/BBC 32K CATALOGUES, TOO!

To: SOFTWARE SUPERMARKET,
87 Howard's Lane, London, SW15 6NU, England.

If you do not want to cut this magazine, write your order out carefully on plain paper and quote this number: **SU12**

I own a 16K/48K Spectrum. (Delete one). I enclose a cheque/PO made payable to Software Supermarket. OR Charge my VISA card no.

☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

Signature ....

Please write clearly. If we can't read it, you won't get it.

Name ....

Address ....

.... Postcode ....

Phone, if any, in case of query ....

Program Name	Computer	Price
		£
		£
		£
		£
		£
		£
POSTAGE	U.K. Add 55p only per order	£0.55p
AND	EUROPE. Add 55p for each program	£
PACKING	OUTSIDE EUROPE. Add £1 for each program airmal	£
OUTSIDE EUROPE PLEASE ADD £1 EXTRA FOR REGISTERED MAIL	TOTAL	£

Diet challenge gains weight

WE ARE WRITING concerning your review of Dietron in the September issue. The review is of particular interest because we produce Diet Master for the 48K Spectrum, a copy of which you have had for review for some time. We bought Dietron originally and experienced the same crash and errors you experienced, so we felt we could produce something better, hence Diet Master.

One of your criticisms of Dietron reflects some of the comments made to us about our program, i.e., it is supposedly far easier to obtain nutritional information from a book rather than to spend time loading the program and running it. That may be so for a qualified dietician but not for anyone else.

So we would like to issue a challenge to people with 48K Spectrums. If anyone can produce the information provided in our program in a shorter time than our program, including loading, we will remove our program from the market.

We will provide the appropriate nutritional books. What the user must do is to write a personal RDA table based on occupational category, sex and age; construct an accurate weight-range graph, based on height, weight and frame size; for everything which has been eaten in a particular day they must provide accurate figures on eight different nutritional compositions for each food, including things like sugar and milk; and, finally, they must construct a histogram for each of the nutrients in our program, showing the recommended RDA figure against what has been consumed of that nutrient, and give a percentage.

If anybody can produce all that information in a shorter time than our program can we will keep our promise and withdraw ours from the market. As a guideline, for an average day's eating it takes approximately 20 minutes to do this with Diet Master. This may seem a trivial point but if you can publish the challenge, perhaps we can dispel your, and many other people's belief that doing it from a book is quicker.

Also, a diet program, although obviously of use to anyone slimming, is designed primarily to provide a balanced intake of food. Your over-emphasis on the slimming headline — Dietron lacks weight in the slimming business — is misguiding as to what a diet program is there to do.

Laurie Sinnett & Louise Buckle, Delta 7 Software, Leeds.

Classified directory

CONGRATULATIONS on a very well-presented magazine. The Software Directory is an excellent idea and should be continued in future issues. Why not put a list of ZX-81 games in one issue and in another issue the Spectrum list? That way one full list of games for each computer can be published in one issue.

Another good idea would be to put the list of games into subheadings, such as Adventure, Arcade, Business. That way, if one wants an adventure game he would have to look only under that subheading instead of looking through the whole list.

Farley Scollick, Egham, Surrey.

Random access

PERHAPS 16K Spectrum owners would like to try the following RANDOMIZE USR commands:

RANDOMIZE USR 1000→1012
RANDOMIZE USR 1331→1332
RANDOMIZE USR 3000
RANDOMIZE USR 4000
RANDOMIZE USR 9000
and LIST.

Has anyone beaten my Orbiter high score? — 1,550,450. It took me seven hours and I stopped only when cramp in my fingers set in.

Lee Overy, Mynydd, Isa, Nr Mold, Clwyd.

Notable notemaker

I HAVE just typed-in Notemaker — Program Printout, July, 1983 — by R Frost. I found it a most useful and interesting program which has made it easier for me to create tunes on my Spectrum. When a tune is played back, however, the music is very jerky and not always recognisable.

There is a simple solution which needs no extra lines added. When you press "m" to play back, press two keys e.g., "n" and "m" alternately, and the music flows, eliminating the gaps between notes. Press the key just as the note is finishing to obtain the best effect.

I enjoy your magazine very much and have bought every issue since I bought my computer a year ago.

Matthew Ashton, Bury, Lancs.

Spellings of the world

THANK YOU for your favourable review of our Countries of the World cassette for the Spectrum. We are working hard to produce original software for the new generation of colour computers and I think you will agree that in this case we have succeeded.

Unfortunately, your reviewer closed his remarks by disputing our spelling of the capital of Andorra. Even more unfortunately he stated "little mistakes like that spoil the program".

Such global criticism is ill-judged and unfair. We undertook a great deal of research into the names, capitals, languages, currencies of all the 170 or so Countries of the World, using a number of reference books before we launched the cassette and we stand by our data as being accurate.

Your reviewer is clearly not aware that many countries have more than one national language and more than one accepted spelling for the names of the capital. Andorra is a case in point. It is a small state on the border of France and Spain and dialects of French and Spanish are the main languages.

The various reference books contain three versions for the name of the capital as *Andorra-la-Vella* — Philips Illustrated Atlas, Philips International Atlas and the Times Concise Atlas; *Andorra-la-Vieille* — Statesman Year Book; *Andorra-la-Vieja* — The Times Atlas. The Hamlyn World Atlas and the New Oxford Atlas give the name of the capital simply as *Andorra.* We chose the second version and your reviewer prefers the first.

There is no space in the Spectrum RAM to permit us to give alternative spelling for capitals although we are able to give all the main languages and currencies. I therefore feel that we are offering an excellent product which is good value for money.

Andrew Hewson, Hewson Consultants, Wallingford, Oxon.

Quality does not impress

I AM writing as I believe readers may be interested in my experiences with Sinclair computers. Two weeks ago I bought a ZX-81 from Currys electrical store in Bristol. Encouraged by favourable reviews I had read in various computer magazines, including yours, and also the large amount of software available and the reasonable price, I considered it a good buy.

Unfortunately after three days of endless trying and frustration attempting to get the computer to accept programs either from tape or by typing them in, I concluded I had bought a dud. Although a little fed up at having spent three days establishing that the computer did not work properly I returned it to the shop.

While I was there I met another customer who had had two ZX-81s, both of which had not worked properly. Currys, unable to supply a replacement, gave me my money back and, undaunted by this experience, I had enough faith to buy another ZX-81 from Currys at Bedminster.

Again I returned home excited by the prospect of at last experiencing the joys of home computing. Again the computer did not work properly and had to be returned.

Although disappointed by this episode, I ascribed it to bad luck and decided to pay a little more to get a better-quality computer which would prove more reliable. Thus a week later, having again looked through the reviews in computing magazines and at the availability of software for different computers, I bought a Spectrum 48K computer.

As with the other two computers the Spectrum did not work properly, refusing to accept programs.

At that point I started to get a little angry and upset. Back went the computer to W H Smith where I had bought it. While I was there another customer was taking back a ZX-81 which had gone wrong. Amazingly it was his fifth which had gone wrong or had failed to work in a week.

When my first computer refused to work, initially I blamed my tape-recorder, as I know that some are not compatible with home computers and tested that by going to W H Smith, with a demonstration model which was on display running a program on it. It worked perfectly.

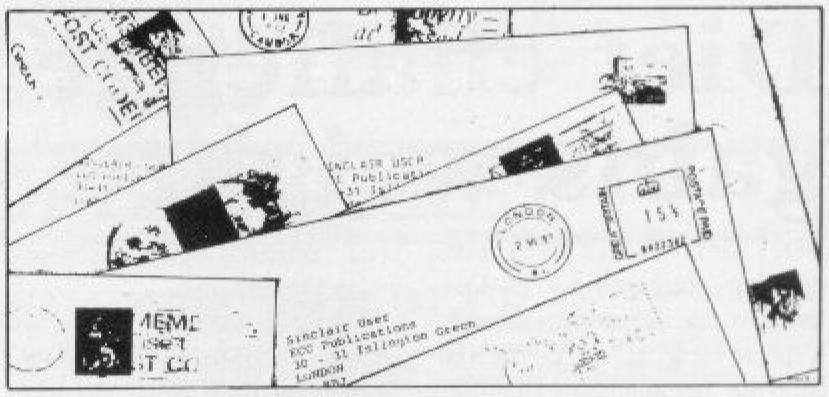
Again with the Spectrum initially I blamed the tape recorder. Again I tested it by taking it to the ZX Centre in Gloucester Road, Bristol, which sells software for Sinclair computers. Again the tape recorder loaded a Spectrum with a program.

This saga of Sinclair computers going wrong seems difficult to stomach and I wonder how Sinclair earned its reputation of being reliable? I am now at a loss what to do.

I would like to have a Spectrum which works to gain access to its unrivalled software and hardware add-ons but I do not think I could go through the ordeal of buying another, only to find it break down yet again and have the trouble and effort of taking it back.

I would like to own a home computer but my recent foray with Sinclair has given me grave doubts about which one I should now buy.

Christopher Watkins,
Bristol.



Corrections on account

THANK YOU for your review of my Bank Account system for the Spectrum in *Sinclair User*. The date validation problem has now been corrected.

It may be of interest to readers that I am also marketing a Diary System written to the same standards as Bank Account for £3.

Also now an enhanced version of Bank Account is available for £4.

This version allows all transactions to be analysed by user-defined codes.

Keep up the good work, *Sinclair User*.

K J Gouldstone,
Wallington, Surrey.

Speeding command

I HAVE HAD a 16K ZX-81 for eight months. I have discovered a poke which speeds some commands dramatically. It is Poke 16389,76. To prove the speed type:

SLOW Program 1.
POKE 16389,76
5 SLAVE " "
RUN

Note how long it takes to run, then pull out the mains plug — for the ZX-81 — for about a second, put it back in again and type:

5 SLAVE " " Program 2.
RUN

You will see that Program 1 works much faster than Program 2. Then type:

POKE 16389,76
NEW

See how quickly it did it. It has a host of other uses, including clearing screens which have been scrolled instantly.

It has the disadvantage that graphics can wobble. My RAM pack is a Sinclair and I am not sure if it will work on other makes such as a Memotech.

Edward Wright (aged 12),
Rochdale.

Patience needed

THE PATIENCE program by Andrew Price in the September issue does not work. That is due to values not being defined in the array DIM N(7) in line 15.

It can be rectified by the addition of a single line:

'50 FOR X=1 TO 7 : LET N(X)=5 : NEXT X'

S Wilson,
Ardmore, Co. Derry.

Rotating plotter

WHILE experimenting with my 16K Spectrum, I discovered that typing:

PLOT 128,88
DRAW 30,30 4E4

draws a shape and rotates it. Changing the third number in the DRAW statements changes the shape and size of the object. Also typing RANDOMIZE USR 3280 scrolls the screen up one character. This is the Spectrum ROM routine for scroll.

Neil Durant,
Selby, N. Yorks.



Softek software for the Spectrum. Dragon and Oric should be available in most major outlets such as W. H. Smith, Lasky's, Spectrum and selected branches of Menzies as well as through our nationwide dealer network. Alternatively fill out this coupon and we'll rush you your Softek game by return of post!

WARNING! All programs are sold according to Softek's terms of trade and conditions of sale. Copies of which are available on request.

All Softek software comes with a perpetual guarantee. Should it ever fail to load return it for a replacement. If the tape shows signs of physical damage then please enclose £1.50 to cover costs.

GSH

SOFTEK SOFTWARE
12/13 HENRIETTA STREET, LONDON WC2
Tel: 01-240 1422

SPECTRUM GAMES:

OSTRON	☐	£5.95
FIREBIRDS	☐	£5.95
ROBON	☐	£5.95
REPULSAR	☐	£5.95
MEGAPEDE	☐	£5.95
MONSTERS IN HELL	☐	£5.95

ORIC GAMES:

GALAXIANS	☐	£6.95
SUPER METEORS	☐	£6.95

DRAGON 32:

MONSTERS	☐	£6.95

Please send me the games as ticked

Total cheque/P.O. enclosed £ ______ payable to 'SOFTEK'

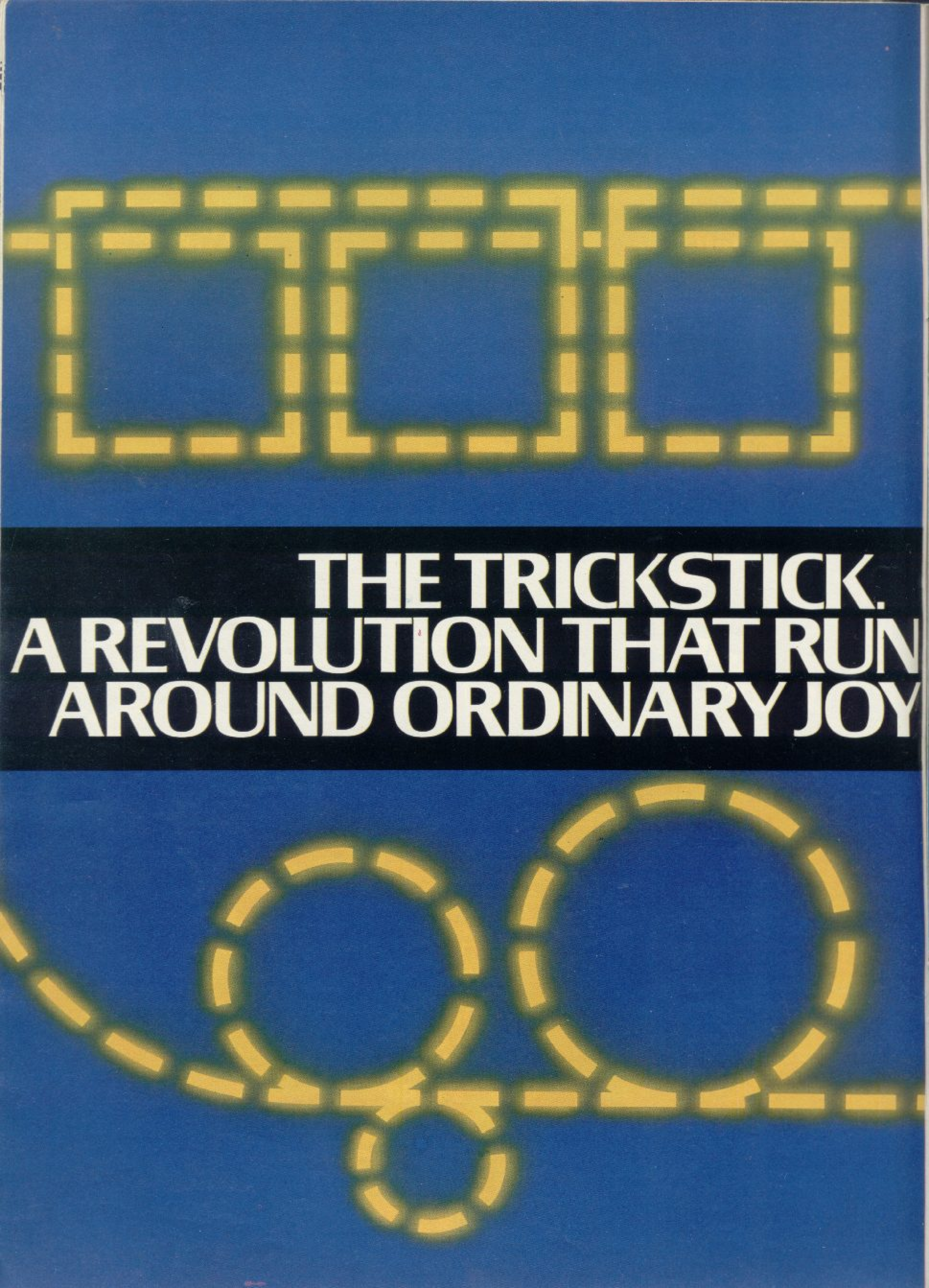
PLEASE SEND ME A CATALOGUE ☐
PLEASE SEND ME DETAILS OF 'SOFSY
YOUR HIGHLY ACCLAIMED UTILITIES FOR T
SPECTRUM ☐

NAME ....

ADDRESS ....

....

SOFTEK SOFTWARE
12/13 HENRIETTA STREET, LONDON WC2


THE TRICKSTICK.
A REVOLUTION THAT RUN
AROUND ORDINARY JOY

You know what it's like when there's someone closing in fast and your joystick won't do what your brain wants it to.

It won't let you loop or curve the way you'd like, or arc and spin at the speed you want.

You can't get away quick enough, so what happens? ZAP!

For just £28.00 (+ postage), the Trickstick responds at the speed of light.

With its revolutionary light sensitive controls and own interface, the Trickstick lets you go where you want, at the speed you want.

Not just up and down or side to side, but round and round in any sized curve or loop you need to build up really big scores.

And the Trickstick is easy to use. All you do is pass your thumb or fingers over the controls and your craft responds.

Immediately.

And because the only moving parts are the firing buttons, the new Trickstick will last far longer than old fashioned joysticks.

Best of all, for £28.00 (+ postage), you get a Trickstick, a special training program and a chance to enter The National Trickstick Championships.

Up to eight people can play simultaneously.

For the very first time, you can now play with up to seven of your mates.

With our specially written game, you can either play against the computer against one friend, in teams of two or three or however you want.

Just by plugging in extra interfaces to each



S RINGS
STICKS.

other, up to eight of you can loop the loop and battle it out. All at the same time.

So if you thought computer games were already exciting, wait until you get your hands on a Trickstick.

Revolutionary new software.

Developed especially for use with the Sinclair ZX Spectrum and fully compatible with standard Kempston software, the Trickstick makes your existing software even more fun.

But because it's so revolutionary, it's actually made possible a whole new generation of software.

The first of this new generation is Attaktics, a brand new game which really brings out the full potential of the Trickstick and is available for only £7.50 when you buy your Trickstick.

So fill in the coupon now. And start running rings around your mates before they start running rings around you.

Please send me (state number required):–
[ ] Trickstick/s with training cassette at £28 each £______ [ ] Attaktics at £7.50 (with each Trickstick) £______ [ ] Attaktics at £10.00 (without Trickstick) £______
Postage 65p. I enclose Cheque/P.O. for £______ made payable to East London Robotics Ltd.
My Access / Visa is [ ]
NAME ADDRESS SU1

Please send to: East London Robotics Ltd., Gate 11, Royal Albert Dock, London E16. 24 Hour information service: 01-471 3308. 24 Hour Access/Visa ordering: 01-474 4715. Special enquiries: 01-474 4430 (Telex: 8813271).

EAST LONDON ROBOTICS

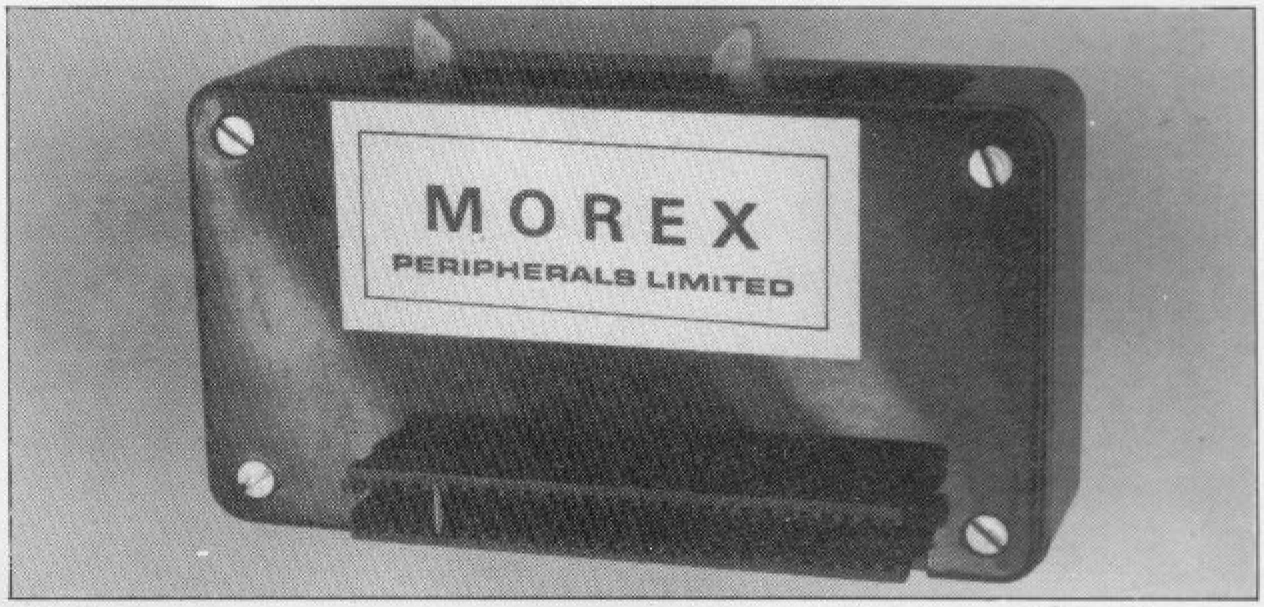
Fuller puts all its eggs in one basket

THE FULLER BOX is an extension which looks natural to the back of a Spectrum. It contains a sound board, amplifier, joystick port and separate cassette EAR and MIC sockets.

The sound board contains the AY-3-8912 sound chip used in many computers and has three programmable pitch tone supplies, plus a noise generator. It also has envelope control to give rising or falling pitched sounds.

The sound board works on port numbers 63 and 95, while the joystick works on port 127. The joystick socket is the standard Atari one and besides the demonstration cassette some commercial software will also work with it, as it is similar to the Kempston joystick.

It costs £30.75 for the basic unit — called the Fuller Box — and the master unit costs £55.75, which includes the speech chip. You can if you wish upgrade to the speech chip at a later date. Fuller Micro Systems, The ZX Centre, Sweeting Street, Liverpool 2. Tel: 051-236 6109. Other shops sell the units.



Easy-to-use double Spectrum interface

MOREX has produced a Centronics and a proper RS232 interface for the Spectrum. Both are contained in a small black box which plugs into the back of the Spectrum. Only 850 bytes of machine code are required to operate the interface and it is located below the USR-definable graphics section of the 16K or 48K RAM — both versions are supplied on the same tape.

Both interfaces will operate via the LLIST and LPRINT commands once a call to the machine code has been made via the USR command. The RS232 will also allow INKEY$ from an RS232 device. The code sent can either be all codes from 0 to 255 or they can be sent as TEXT which would normally appear on the screen.

Various speeds can be set on the RS232 to a maximum of 600 baud on a 16K machine — it can be set higher but the manual warns it can be unreliable — or 4,800 baud on the 48K. The baud rate cannot be split, to work Prestel for instance, at 1,200 one way and 75 the other.

The RS232 has the same handshaking as most professional devices — CTS, RTS and TX, RX data — on a 7-pin DIN socket. No plug is supplied.

The only difficulty was finding some device with which to try it. It will not work with non-standard devices as it requires a negative voltage to register as the LOW condition. With a BBC Micro Model B it worked very well; as the BBC allows the RS232 to act as the keyboard, the whole machine could be controlled from the Spectrum, which should be very useful for schools.

The RS232 is also a both-way device, so PRINT statements and programs can be fed into the Spectrum as well. It is simple to use and very well-documented in the manual supplied, including a list of system variables for machine code users.

The Centronics interface has a 26-way IDC connector — the same type as the BBC — so there should be no difficulty in obtaining a printer cable. A graphics tape is also included for Seikosha, NEC or Epson printers to permit a screen COPY to be done in two sizes — but not using the COPY command.

The edge connector is also extended through to the back for any other add-ons and the port addresses used are 254 and 127.

The Morex interface costs £45.95 from Morex Peripherals Ltd. An RS232 lead to a 25 D-plug costs £13.45. It will also work with a version of Tasword-2, the Spectrum word processor.

Unit cuts loading errors

THE ELINCA ZX Tapeloader is a box which contains all the elements to clean doubtful tapes and to ensure perfect SAVEing and LOADing of programs. The black box contains a small meter with which to set the level of the input from the tape recorder, a three-position switch for selecting SAVE and LOAD, and two tape filters. It also has a red LED to indicate what mode it is in. The LOAD amplifier keeps the signal constant and filters-out noise caused by the pening the signal. The SAVE filter is a passive — non-powered — one which eliminates noise.

The unit has two jack sockets in one side and two leads from the other to plug into the EAR and MIC sockets of the computer. It is not necessary to keep unplugging the leads with the unit on SAVEing and LOADing. The unit is powered by a PP3 battery which has to be fitted inside the unit by the user — it is not supplied. It works very well and having a meter on it makes it easy to set up.

The unit is guaranteed for one year and may be returned within seven days for a refund if you are not satisfied.

Elinca Products Ltd, Lyon Works, Chapel Street, Sheffield, priced at £14.99.


H·U·R·G
HIGH LEVEL USER FRIENDLY
REAL TIME GAMES DESIGNER
M
ALL YOU NEED
IS IMAGINATION

N·O·W...

THE GAMES YOU IMAGINE CAN BE THE GAMES YOU PLAY

DESIGN YOUR OWN COMPUTER GAMES IN MINUTES

Introducing the incredible H.U.R.G. — The ultimate game program for people who want to really play games. With H.U.R.G. the hardest thing you will have to do is to think of a game title, and design the characters.

HIGH LEVEL — requires no programming skills — simply design the shapes you want, and H.U.R.G. will animate them into the most amazing on-screen action you've ever seen. Choose any setting for your game, from mazes to outer space or sinister caverns — the only limit is your imagination.

USER FRIENDLY — H.U.R.G. will lead you through a series of easy to follow procedures, ending in the creation of a game that is as wild as your imagination!

REAL TIME — You can see exactly what you're creating at all times. Every game has hundreds of variations, and you can change its features at any time. You can speed up the action, change the size of the characters and even make them more vicious — it's all up to you; and you can see it all on-screen immediately.

GAMES DESIGNER — H.U.R.G. enables you to design and store the games you create on cassette and play them later using H.U.R.G. as the control program. It's the one program you will never tire of.

Now you can create all the stunning arcade effects that up until now have only been available to professional software houses.

BONUS

To really fire your imagination, H.U.R.G. includes three ready-to-play fast-action arcade games, created using H.U.R.G.

Design a Game...

WIN £3,000

Each month up until January 1984, three prizes will be awarded every month for the best games of the month

At the end, the best game will win a grand prize of £3,000

YOU could be a famous games designer! Every entrant has the opportunity of being published by Melbourne House and earning royalties.

Details of the competition are available with H.U.R.G.

Orders to:
Melbourne House,
131 Trafalgar Rd,
Greenwich,
London SE10

Correspondence to:
Melbourne House,
Church Yard,
Tring, Hertfordshire HP23 5LU

Trade enquiries welcome.

☐ Please send me your free 48 page catalogue.

48K SPECTRUM Cassettes

☐ H.U.R.G.	£14.95
☐ The Hobbit	£14.95
☐ Penetrator	£6.95
☐ Terror-Daktil 4D	£6.95
☐ Melbourne Draw	£8.95
☐ Computer Bridge	£8.95
☐ Abersoft Forth	£14.95
	£ ....
	£ 80
TOTAL	£ ....

I enclose my ☐ cheque ☐ money order for £ ....

Please debit my Access card No. ....

Expiry Date .... Signature ....

Name ....

Address ....

.... Postcode ....

SU 11.83

H.U.R.G. will be officially released at the end of October. Get your order in now, and reserve your copy so that you can be among the first with this revolutionary software!

Access orders can be telephoned through on our 24-hour ansafone (01) 858 7397.

Melbourne House

Interesting addition

KELWOOD COMPUTER Cases has produced a powerful amplifier for the Spectrum to amplify games and keyboard beeps. It is contained in a plastic box only $4\frac{1}{2} \times 2\frac{1}{2} \times 1\frac{3}{4}$in. and contains a one-chip amplifier based on the LM380 chip.

It has a power ON/OFF switch, volume control and loudspeaker built-in and it runs off a single 9V PP3-type battery, which is included in the price.

It should improve most graphics games which have sound and make them more interesting.

A version of the amplifier can also be obtained built into the company's power base module — a metal sloping stand with power ON/OFF and tape LOAD-SAVE switch. It is called the Sound Power Base. It requires no battery as it is driven from the Spectrum power supply.

The Supersound Spec-amp costs £7 and the Sound Power Base £19.95 or £17.70 from Kelwood Computer Cases, Downs Row, Moorgate, Rotherham S60 2HD. Tel: 0709-63242.

Low-cost briefcase

A HARD green plastic briefcase which can be used for a Spectrum costs only £3.99 at W H Smith. It is intended for children going to school and is approximately $15 \times 11 \times 3\frac{1}{2}$in. Although it contains no foam or other fixings to hold down a Spectrum, they can be put in by a user easily to his design.

The only thing to watch is the hinges on the front clasps as they are thin and will snap after prolonged use. They should be strengthened with carpet tape or flexible plastic sheet should be stuck over them. The cases are available in four colours.

Simple link with the outside world

AMBIT has produced a modem to go with its ZX-81 RS232 interface.

The 300 baud modem is acoustic-coupled to the telephone line by pushing the standard telephone handset into two foam blocks containing a microphone and loudspeaker on top of the modem.

That makes the unit usable on a normal telephone and it does not have to be wired-in and does not require British Telecom to provide a special plug.

The modem is easy to construct but a few points need to be emphasised which are not in the notes.

One is that the kit does not include a power supply for +12V/+5V/−12V required to run the modem. You will have to design and build one on Veroboard, as the company does not market a suitable one. The circuit relies on through-the-board connections made by soldering the component wires on both sides of the board, so check them carefully.

No mention was made of how to connect the piezoelectric devices used as loudspeaker and microphone.

The microphone has three connections and was found to work correctly only when the outer two were used.

It is recommended that you also buy the hardware kit, as it makes a portable box as well as containing all the electronics in the bottom.

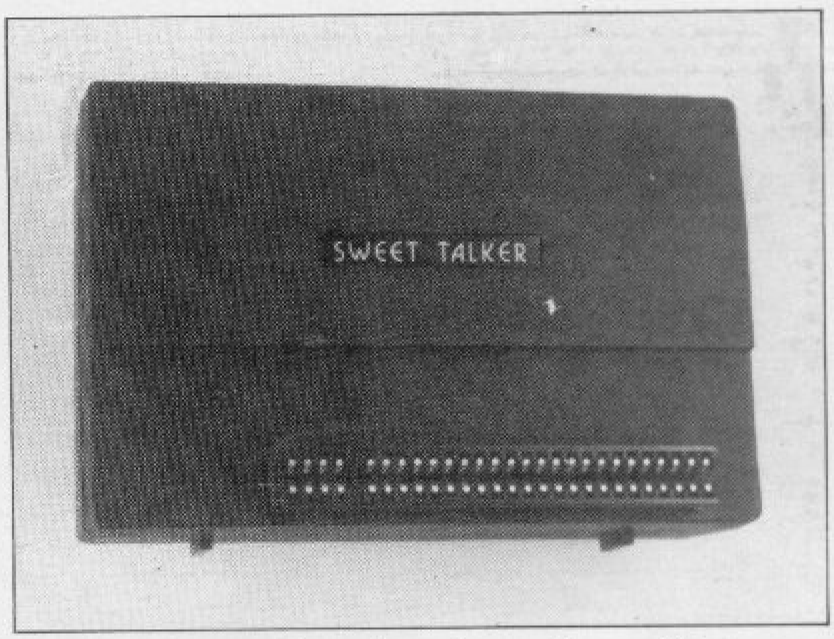
Tried with several databases, including the Ambit Rewtel, it worked extremely well.

The ZX-81 interface costs £32.40, the modem £22.94, and the hardware kit for the modem £13.80, plus a flat charge of 60 pence for postage.

The interface to the modem is TX data, RX data and Carrier — RS232 standard. You will also need a motherboard of some size with the interface, as the program to run it needs more than 1K and the interface is not supplied with an edge connector.

Ambit International, 200 North Service Road, Brentwood, Essex CM14 4SG. Tel: 0277-23090.

Natural sounds by Cheetah



CHEETAH MARKETING has produced a speech output device called the Sweet Talker. It is complete in a black plastic box the same size as the 32K RAM pack for the Spectrum. The unit contains a very powerful amplifier and the tape with it not only auto-runs to introduce itself but also shows some very good programming practice.

The instructions are very simple and the unit should not clash with any joysticks or other items, as it uses I/O port address 7. That may clash with some Sinclair peripherals — the Microdrive, for instance — as Sinclair tends to use only one bit of an address going low to operate equipment and using port 7 takes all the bits from B7 to B3 low. Cheetah is looking into that and may modify the address.

Programming is done by using phonetic sounds which allow you to produce the sounds necessary to make up a full word. They are put out as numbers to Sweet Talker in sequence from a DATA statement when you want words spoken. Silences can be included to stop the words or to provide pauses between words — of up to 200ms. The Sweet Talker seems to be about eight to 10 times as slow as others available, which makes it sound more natural. There are ZX-81 and Spectrum versions.

Sweet Talker is available from Cheetah Marketing, 359 The Strand, London WC2. Tel: 01-240 7939. John Menzies and Boots also stock it. The cost is £34.95.



THE FABULOUS
CASSETTE
50
FROM
cascade
50 GAMES ON ONE GREAT CASSETTE
ONLY
£9-95
DON'T MISS THIS
INCREDIBLE OFFER
50 FANTASTIC
GAMES ON
ONE CASSETTE
ONLY £9.95 (INC.P&P and VAT)
SPECTRUM
50 fabulous games
VIC 20
50 fabulous games
EXPRESS DELIVERY - ORDER NOW
Please send me by return of post, Cassette 50 at £9.95 per tape. I enclose a cheque/postal order for £ made payable to Cascade Games.
Name
Address
Post Code
Country
Dealers & Stockists enquiries welcome.
Please send me (tick appropriate box)
Spectrum VIC
cascade
Cascade Games,
Suite 4, 1-3 Haywra Crescent,
Harrogate, N. Yorkshire, HG1 5BG.
England.
Telephone: (0423) 504526
SU11/83

New angle lacks new excitement

HANG GLIDER is yet another variation on the theme of guiding a craft along a tortuous path. In this case the craft is a hang glider which flies above a river. There are several maps and for each you have three gliders. If you touch the buildings, mountains or whatever on either side, or if you lose altitude and fall into the river, you lose one glider.

The glider's circular movements, based on hang glider performance, introduce a note of difficulty which makes the game more interesting but otherwise as you do not score until you have made a safe landing, there is not a tremendous amount of excitement. Six grades of play will help to improve your piloting skills.

Hang Glider for the 16K ZX-81 is from S Electronics, 1 Orchard Road, Hayling Island, Hampshire.

Slow motion

WORLD OF ILLUSIONS, for the 16K ZX-81, features a robot called Jimmy who is attempting to reach the centre of a maze to destroy a giant globe, picking-up along the way various pieces of equipment which are guarded by giant bats.

The graphics — bats, globe and the evil Dr Brock — are impressive but the action is painfully slow and the bats stubbornly resist attempts to blast them out of existence with a laser.

There are three levels of play but they only reduce the time allowed to reach the centre of the maze without speeding the game.

World of Illusions is available from Contrast Software, Farnham Road, West Liss, Hampshire GU33 6JU, and costs £4.95.

Getting the odd word into a limited space

MOST PEOPLE either hate or love word puzzles; there is no in-between. The same can be said for **Wordfit,** an exercise in literary skill, which runs on the 16K ZX-81. The program designs a word square which can be from eight characters across and down to 20 characters.

On the first level of eight characters you have a free choice of the words you want to enter on the grid but from the second to most difficult level random letters are scattered around by the computer which you must fit into words.

You can leave or change the game at any time during play. You can clear a square and start again or opt to start on a higher or lower skill level.

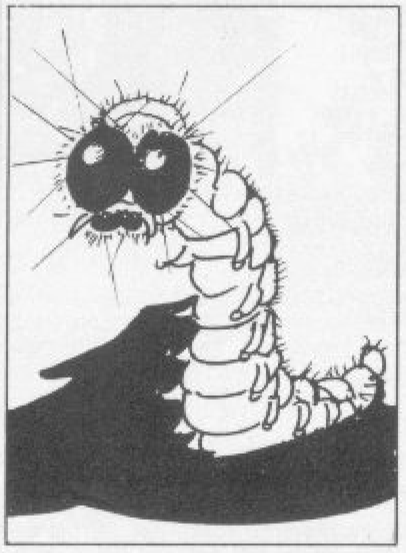
To put words into the square you must position the flashing cursor where you want the words to start and then type-in your word. If you use a word twice the computer will inform you with an error message and as you enter words the computer will display the number of words which you have on the screen.

The game is interesting for a time but soon it becomes repetitive. When you have been through all the levels once you can lose interest very quickly.



The action is fast and you are not kept waiting for the computer to form the next word square. The main problem with the package is the lack of good instructions. Only the main options are shown on the insert card and there is no explanation of how the game works or the philosophy behind it.

Wordfit will provide entertainment for those who attempt *The Times* crossword every day. It costs £5 and can be obtained from Ramwriter, 3 Vumbra House, 2 Cedar Gardens, Sutton, Surrey.



Sparkle is lacking

SIX GAMES on a single tape for the 16K ZX-81 have an introductory trailer which is enlivened by some crude but amusing graphics. You load each program individually.

The process might have been a little less laborious if the games were on two sides of the tape instead of only one.

The games are satisfactory, though hardly sparkling with originality. **Centipede** is a variation on the shoot-out theme; in this case you shoot the centipede while trying to avoid the lawnmower and the grasshopper.

In **Haunted House,** you are chasing food and energy pills while being chased by ghosts— shades of Pac-man. **Berzerk** entails escaping from robots, **Nasties** is another shoot-before-they-get-your-power-pods game, and in **Kong** you have to climb down a building while being pelted with barrels, and there is even a pretty girl to kiss you if you reach the bottom.

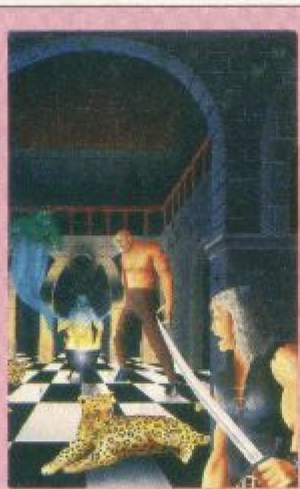
Finally, **Kermit** is a variation on the theme of taking the frog for a walk, watching for traffic on a busy road. The tape is available from A Stubbs, Astle Farm East, Chelford, Macclesfield, Cheshire SK10 4TA.

Genuine hi-res in space invasion

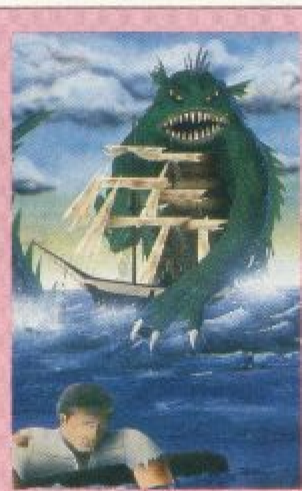
ODYSSEY Computing has achieved the remarkable feat of producing, with no extra hardware, a genuine high-resolution version of Space Invaders for the 16K ZX-81. **Invaders** offers superior graphics and allows one or two people to play and provides a choice of missile-firing and bomb-dropping rates. The result is an absorbing game which should satisfy trigger-happy space fighters. Invaders is from Odyssey Computing, 28 Bingham Road, Sherwood, Notts NG5 2EP. It costs £4.95.

FREE SOFTWARE!
FREE HARDWARE!

THE SOFTWARE



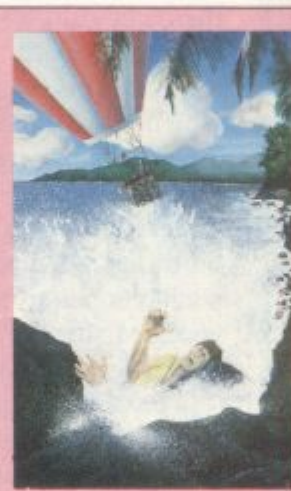
Leopard Lord
Conquer monsters, mazes and magical items, face Fordel the Leopard Lord. Fight tooth and nail for your life.
£10 Spectrum 48K, Dragon 32, Oric 48, Commodore 64.



Terror from the Deep
If a storm sinks your ship, could you survive to rid the world of the Terror from the Deep?
£10 Spectrum 48K, Dragon 32, Oric 48, Commodore 64.



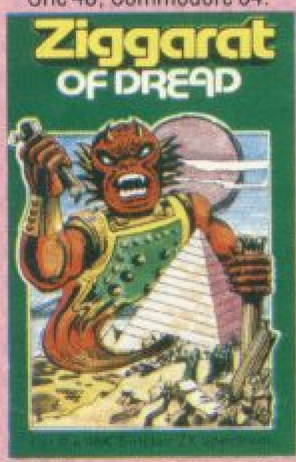
Ace in the Hole
Ace Brannigan, can you escape the Humane Orbital Legislation Enforcer and reach your shuttle and freedom?
£10 Spectrum 48K, Dragon 32, Oric 48, Commodore 64.



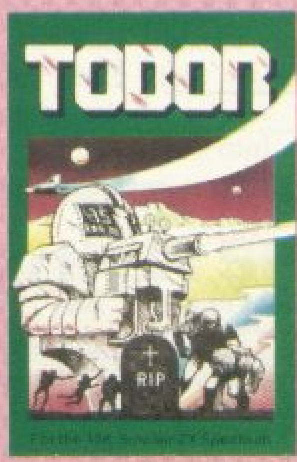
Horror Atoll
What is the object on the rock in the middle of the lagoon? Can *you* destroy it?
£10 Spectrum 48K, Dragon 32, Oric 48, Commodore 64.



Cry Wolf!
You have become a werewolf. Only Albanon the Seer can help you in time.
£5 Spectrum 48K.



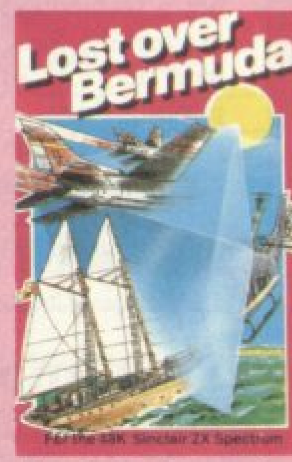
Ziggarat of Dread
Fight the priests of Dreshing, enter the Ziggarat of Dread and rescue your sister before she mutates.
£5 Spectrum 48K.



Tobor
A game of strategy and skill for one or two. Fight the squadrons of robots through 6 levels.
£5 Spectrum 48K.



Chuckman
Popular arcade based game with extras. Follow the quickest route to defuse the time bombs.
£5 Spectrum 48K.



Lost over Bermuda
Will the Bermuda Triangle claim you as its next victim? Will you return alive?
£5 Spectrum 48K.

Cassettes for the Spectrum – £5 each

Fisherman Fred
E x T
Penguin
Sea-Battle
Cosmanoids
Diamond Mine
Golf
Toolkit
Grid Bug

One-Arm Bandit*
Efenders*
Eteor Torn*
'N' Vaders*
Terroroids*
Goblin Crusher*
Never Trust a Blond*

Assembler*†
Disassembler*†

*48K Spectrum Only
†£10 each

Picnic Adventure BBC only £5.

Cassettes for the VIC 20 · Unexpanded – £10 each

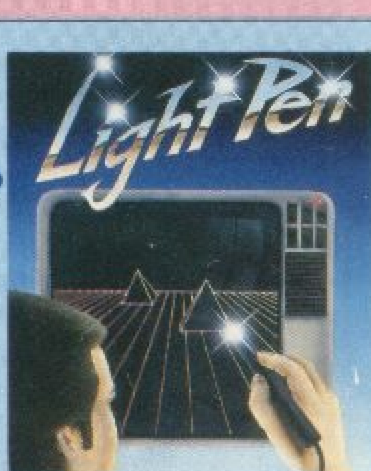
GAMES PACK 1
Fruitshop
Sea Wolf
Cube
Peckman

GAMES PACK 2
Frogger
Invaders
Othello
Roboball

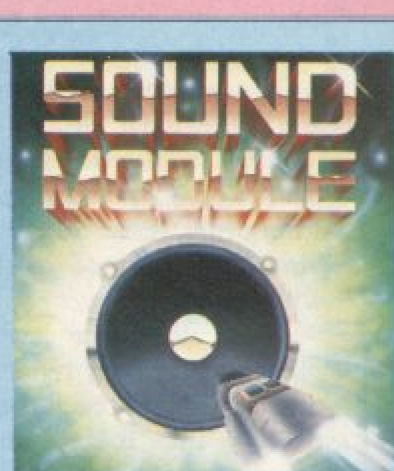
GAMES PACK 3
Head on
Apollo 8
Wobble Board
Space Attack

GAMES PACK 4
Crazy Balloon
Sea War
Mazerace
Breakout

THE HARDWARE



THE LIGHT PEN
CREATE PICTURES, SKETCHES AND GRAPHS OR 'PICK' FROM MENUS. COMPLETE WITH INTERFACE CIRCUIT (PLUGS DIRECTLY INTO THE USER PORT) AND SOFTWARE PROGRAM WITH COMPREHENSIVE INSTRUCTIONS.
£30 SPECTRUM, BBC, ORIC, DRAGON, VIC 64, AND VIC 20



SOUND MODULES
£10 BBC Sound Module fits neatly inside your machine to let the sound come through the more powerful speaker on your television. No soldering required.

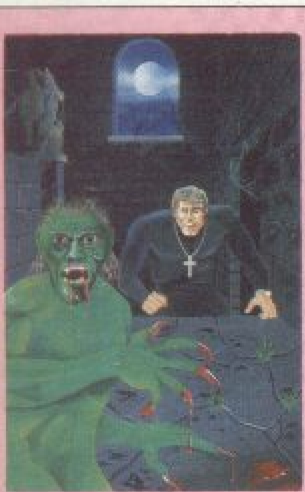
£15 SPECTRUM Sound Module plugs into the user port and generates its own sound through its own speaker.

ADD-ON ELECTRONICS LTD
Units 2, 3&4
Shire Hill Industrial Estate,
Saffron Walden,
Essex CB11 3AQ

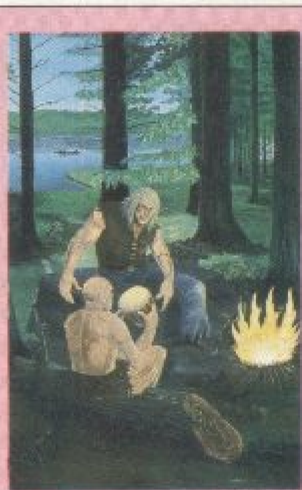
For every £1 of hardware you buy you can choose £1 of software absolutely free. (except Manta Printer)

OR

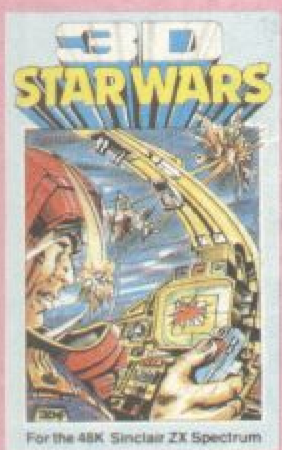
For every £1 of software you buy you can choose £1 of hardware absolutely free.



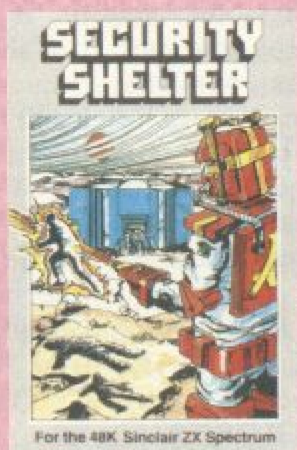
Arcane Quest
Can you face the beastly one with nothing but a cross and a heart full of purity?
£10 Spectrum 48K, Dragon 32, Oric 48, Commodore 64.



The Roundsby Incident
You are a mercenary in the Service of Rambol the Merchant. What is Roundsby's secret?
£10 Spectrum 48K, Dragon 32, Oric 48, Commodore 64.



3D Star Wars
You become Luke Clearthinker to battle an entire rebel space fleet on your own to save mankind?
£5 Spectrum 48K.



Security Shelter
You are a 'Gatherer' selected by your unique abilities to probe the mystery of the 'past timers' building.
£5 Spectrum 48K.



STANDARD KEYBOARD FOR SPECTRUM
The keyboard comes complete with high-impact black plastic case and typewriter-style keys. Full easy fitting instructions.
£30

STOP PRESS!



MANTA PRINTER®
Permanent hard copy of whatever is on the screen, prints 80 chars. per second, 40 cols. in width, upper and lower case letters and graphics.
Oric, Dragon, VIC 20, Commodore 64, Aquarius®, Spectrum, BBC.
£120

+ £30 of software

® Registered Trade Mark

EITHER choose the games you want then tick your free hardware to the same value
OR choose the hardware you want and tick your free software to the same value.

SOFTWARE	Qnty	Price	Total	Machine
Leopard Lord		£10		
Terror from the Deep		£10		
Ace in the Hole		£10		
Horror Atoll		£10		
Arcane Quest		£10		
Roundsby Incident		£10		
Cry Wolf		£5		Spectrum 48K
Ziggarat of Dread		£5		Spectrum 48K
Tobor		£5		Spectrum 48K
Chuckman		£5		Spectrum 48K
Lost over Bermuda		£5		Spectrum 48K
3-D Star Wars		£5		Spectrum 48K
Security Shelter		£5		Spectrum 48K
Games Pack 1		£10		VIC 20
Games Pack 2		£10		VIC 20
Games Pack 3		£10		VIC 20
Games Pack 4		£10		VIC 20
Fisherman Fred		£5		Spectrum
E x T		£5		Spectrum
Penguin		£5		Spectrum
Sea-Battle		£5		Spectrum
Cosmanoids		£5		Spectrum
Diamond Mine		£5		Spectrum
Golf		£5		Spectrum
Toolkit		£5		Spectrum
Grid Bug		£5		Spectrum
One-Arm Bandit		£5		Spectrum 48K
Efenders		£5		Spectrum 48K
Eteor Torn		£5		Spectrum 48K
'N' Vaders		£5		Spectrum 48K
Terroroids		£5		Spectrum 48K
Goblin Crusher		£5		Spectrum 48K
Never Trust a Blond		£5		Spectrum 48K
Picnic Adventure		£5		BBC
Assembler		£10		Spectrum 48K
Disassembler		£10		Spectrum 48K

Please indicate machine Total £____

NOW CHOOSE HARDWARE TO THE SAME VALUE

HARDWARE	Qnty	Price	Total	Machine
Keyboard		£30		Spectrum
The Light Pen		£30		
Sound Module		£10		BBC
Sound Module		£15		Spectrum

Please indicate machine Total £____

NOW CHOOSE SOFTWARE TO THE SAME VALUE

Manta Printer		£120		

All prices include P&P and VAT UK only (Add £1 for Europe)

I enclose cheque to the value of £____ or credit my Access ☐ Barclaycard ☐

No. ____ Exp. Date

Name ____

Address ____

Postcode ____

Phone ____

Signature ____ SU Send coupon to:

ADD-ON ELECTRONICS LTD

Units 2, 3 & 4, Shire Hill Industrial Estate, Saffron Walden, Essex CB11 3AQ

This offer applies to mail order only

Scrabble will satisfy addicts and novices



THE WELL-PRODUCED Sinclair computer version of **Scrabble** for the 48K Spectrum should please confirmed addicts of the game, as well as novices, with its easy-to-follow instructions and quick computer responses.

One to four people can play and the computer can represent any number, including all four, thus turning Scrabble into a spectator sport. It has 11,000 words in its vocabulary and will challenge any player who tries to enter a word which is not in the store.

Nevertheless, provided the other players permit, it is still possible to enter a non-existent word to register a high score, a slight weakness in this game although, in the long run, it is more fun not to cheat.

As in real Scrabble, you can trade letters on your rack, juggle them about, miss your turn, and even save an unfinished game for later.

Six levels of difficulty provide a challenge even for experienced Scrabble fans.

Computer Scrabble is available from Sinclair Research, Stanhope Road, Camberley, Surrey GU15 3PS. It costs £15.95.

Users kept in the dark with Hard Cheese

DK'TRONICS **Hard Cheese** would be much improved by a set of instructions; none appear on either the insert or the tape. Whatever the storyline, it is a simple Pac-man-type game in which the aim is to reach the big cheese in the middle of the screen before being eaten by the cats which are in hot pursuit. Neither the action nor the graphics are earth-shaking but there is a certain challenge in overcoming the difficulty of reaching the middle.

Hard Cheese for the 16K Spectrum is available from dK'tronics, Shire Hill Industrial Estate, Saffron Walden, Essex, and costs £4.95.

Slowest game in the galaxy

GALAXY ATTACK is possibly the slowest machine code space-arcade game for the 48K Spectrum.

The graphics used look as if they were prepared for the readers' programs section of a computer magazine and there seems to be no professional sheen to the game at all.

You must take your ship through the depths of space, destroying as many alien ships as possible on your way, before you crash-land on a far-off planet.

The object of your quest, once you have crashed, is to repair your spaceship before the deadly walkers destroy you.

If you reach the third part of the game, which we very much doubt you will, you will find yourself fighting the mothership.

We doubt that you will get further than the second level, as the first will sap all your key-pushing strength. The displays used are colourful but flat and lifeless.

Galaxy Attack is a game for those who are willing to spend hours wading through instructions displayed on the computer screen.

It can be obtained from Sunshine Books, Hobhouse Court, 19 Whitcomb Street, London WC2 7HF. It costs £5.95.

Signalman's nightmare

THE TRAIN GAME for the 16K Spectrum is any budding signalman's dream. It is also an excellent game which is original, well-thought-out and full of action. The idea is that as the newly-appointed chief operations manager of a railway you must keep the trains running, switching points to avoid derailment and stopping at stations to pick up passengers. That is also how you score.

There are several levels of play—and each has sub-levels—with more and faster trains for the increasingly expert player. Even at the simplest level there is plenty to think about. The graphics are simple and realistic, and the scoring, hazards and bonuses are explained very clearly in the insert. Altogether an absorbing and amusing game which might even make you appreciate British Rail.

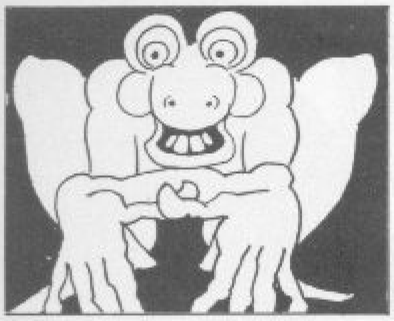
The Train Game from Microsphere Computer Services, 72 Rosebeery Road, London N10 2LA costs £5.95.

Suffering in the Styx

EMERGING from the perils of **Styx** unscathed is not easy. A three-level arcade/adventure game for the 16K Spectrum, it has a spider-filled maze at the top of the screen, a piranha-infested river fringed with deadly seaweed in the middle, and infernal regions haunted by an evil, shrouded figure at the bottom. All you have on your side are fast fingers and your laser power. Nevertheless, a reasonably lively game, if you do not let the piranhas get you down. Styx can be obtained from Bug-Byte, Mulberry House, Canning Place, Liverpool.

Correction

'IN SEPTEMBER we reviewed the Softek **Firebirds,** in which we stated that it had launched a range of programs, of which Firebirds is one, all created by the company compiler. It has been pointed out by Softek that that is not the case, that it has not launched a range of compiled games called Ultima, and that Firebirds was written in pure machine code.'



Toad needs extra pace

EVERYBODY seems to have a fascination with frogs and toads which are likely to be squashed by lorries, bitten by snakes or drowned by dipping turtles.

The latest in a long line of frogger games is called **Road Toad** for the 16K Spectrum.

The toad must jump through three lanes of heavy juggernauts, evade the snakes on the river bank and jump across logs and turtles to get to the lily pads at the top of the screen.

You are given two toads and 100 seconds to avoid all the obstacles.

It would have been better to give the player less time and more frogs because the highway is so packed with lorries that it is difficult to escape even from the first lane.

As with the original arcade version, one or two players can compete against each other for the fastest time in which to get the frogs across.

Unfortunately dK'Tronics has not included a joystick option so it is not as easy to play as it should be.

It is difficult to become accustomed to the key layout as the up, down, left and right keys are all in line and next to each other. As a result it is easy to mix those key combinations.

It would have been better to separate the keys and put them in a joystick configuration.

Road Toad can be obtained from dK'Tronics, 23 Sussex Road, Gorleston, Great Yarmouth, Norfolk. It costs £4.95.

Riding into the last sunset at high speed

ACCORDING to the insert, **Last Sunset for Lattica** represents a distant world where, amid a maze of crumbling building, you have to locate a bomb and defuse it before it blows the entire planet to smithereens.

You are pursued by androids and you must avoid the walls, which are electrified; on the other hand, scattered about are life potions which will give you a new life if you are zapped.

That is the story but this game for the 48K Spectrum is so fast-moving that you will probably forget all about it in the heat of the action.

The fact that you can fire only in the direction in which you last moved tests the reactions even further and if you achieve a high score, you will get a new screenful of hazards. There are several levels of play.

Not a very original concept and the graphics are simple but this is still an exciting, action-packed game which could well prove addictive.

Last Sunset for Lattica is from Arcade Software, Technology House, 32 Chislehurst Road, Orpington, Kent BRG 0DG and costs £5.50.

Striking graphics confusing

ANYONE who has seen 3-D Tunnel will find **Vortex** for the 16K Spectrum familiar. The story is that you are in a spacecraft caught in the gravity well of a giant neutron.

Your job is to fly out of the vortex while firing at the various space monsters attacking you.

The flashing graphics are striking but a little confusing, making scoring difficult. There is also a long and wordy introduction which provides very little helpful information, but fortunately you can go straight to the game without looking at it.

Vortex is available from J K Greye Enterprises, 16 Park Street, Bath, Avon BA1 2TE. It costs £5.95.

Searching for the familiar

QUEST for the 48K Spectrum follows a now fairly familiar adventure format featuring dwarfs, elves, swords, pieces of gold, black spiders, dragons, and a thick forest through which you might find yourself wandering interminably. The graphics, when you finally encounter them, are polished, and experienced adventure games players will probably enjoy trying to guess what answers and actions are required.



Very few prompts are given in the course of the game but the insert gives detailed instructions.

Novices may spend a good deal of time on a rough track choosing whether to go north south, east or west—the game derives plenty of mileage from sending you back to where you started.

You may also be axed suddenly by an elf or killed by a rat, just as you thought you were doing the correct thing, but you can be resurrected. At least you can be sure that it will take time before you exhaust the possibilities, if you are not discouraged first. One hint we can give—it is no use trying to bribe the dwarfs.

Quest is available from Hewson Consultants, 60A St Mary's Street, Wallingford, Oxfordshire OX10 0EL. It costs £5.95.

PLAY TH

Arcade Action For The ZX Spectrum

SPECTRAVISION JOYSTICK £9.95 (arcade action, pistol grip, ATARI® Compatible)



If you want Arcade quality control for your Sinclair ZX Spectrum, you'll find the Protek combination hard to beat. The interface is compatible with a range of software including a number of titles from: ULTIMATE, SILVERSOFT, RABBIT SOFTWARE, QUICKSILVER, QUEST, PSION, NEW GENERATION SOFTWARE, IMAGINE, OCEAN, plus many more.

The protek joystick interface is simple to use. It just plugs in at the back of your Spectrum and is compatible with any "Atari type" Joystick Connector. We recommend the Spectravision Joystick at only £9.95 for Pistol Grip Joystick with a top and base fire button plus specially contoured shape and rubber suction cup footing for single hand operation.

Protek JOYSTICK INTERFACE £14.95



E GAME

HUNTER-KILLER

For the 48K ZX Spectrum

Can you Captain a World War II submarine, hunt the enemy then destroy him with your torpedoes?
Realistic simulation including:

(a) 4 separate screen displays (Control Room, Chart Room, View through Periscope, Navigation Chart)
(b) 18 control functions
(c) Quick kill option

Written by Rod Hopkins

£7.95

Sensational new two-computer option. Additional hardware required, available soon



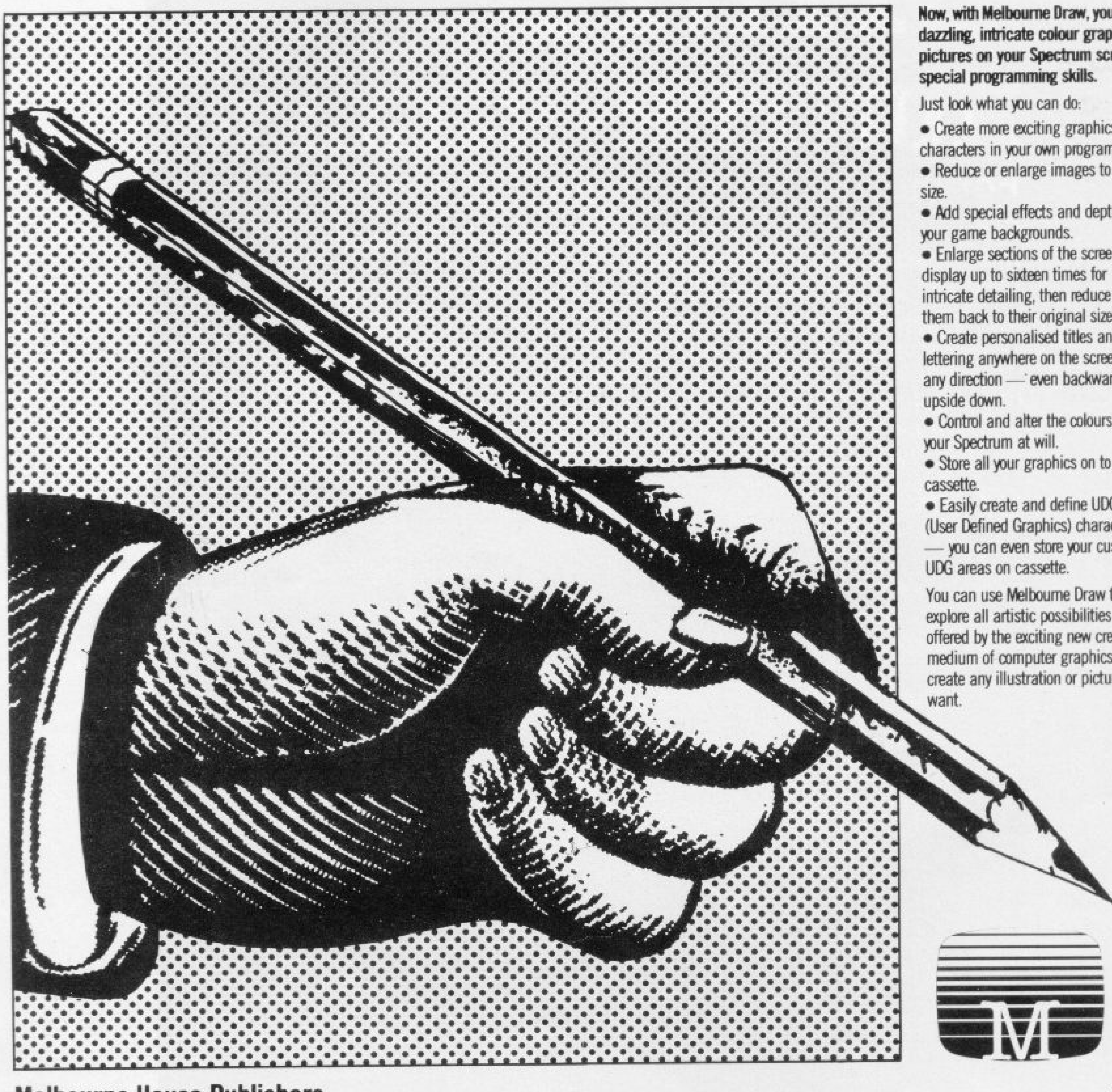
TRADE ENQUIRIES WELCOME

=Protek=

COMPUTING LTD.
1A Young Square, Brucefield Industrial Estate, Livingston, W. Lothian.

Subject to availability. Prices correct at time of going to press.

Ready, Set, Draw!



Now, with Melbourne Draw, you can create dazzling, intricate colour graphics and pictures on your Spectrum screen without special programming skills.

Just look what you can do:

- Create more exciting graphics and characters in your own programs.
- Reduce or enlarge images to any size.
- Add special effects and depth to your game backgrounds.
- Enlarge sections of the screen display up to sixteen times for intricate detailing, then reduce them back to their original size.
- Create personalised titles and lettering anywhere on the screen in any direction — even backwards or upside down.
- Control and alter the colours of your Spectrum at will.
- Store all your graphics on to cassette.
- Easily create and define UDG (User Defined Graphics) characters — you can even store your custom UDG areas on cassette.

You can use Melbourne Draw to explore all artistic possibilities offered by the exciting new creative medium of computer graphics, and create any illustration or picture you want.

SU11D

Melbourne House Publishers

SPECTRUM Books

☐ Understanding Your Spectrum	**NEW LOW PRICE** £6.95
☐ Spectrum Machine Language for the Absolute Beginner	**NEW LOW PRICE** £5.95
☐ Over The Spectrum	**NEW LOW PRICE** £4.95
☐ The Complete Spectrum ROM Disassembly	£9.95
☐ Spectrum Hardware Manual	£5.95
☐ Spectrum Microdrive Book	£5.95
☐ Supercharge Your Spectrum	£5.95
☐ Please send me your free 48 page catalogue	

48K Spectrum Cassettes

☐ Penetrator	£6.95
☐ The Hobbit	£14.95
☐ Terror-Daktil 4D	£6.95
☐ Melbourne Draw	£8.95
☐ H.U.R.G.	£14.95
☐ Computer Bridge	£8.95
☐ Abersoft Forth	£14.95

All prices include VAT where applicable. Please add 80p for post and pack.

I enclose my cheque/money order for £

Please debit my Access Card No. Expiry Date

Signature

Name

Address

Postcode

£	
£ + p/p	.80
Total £	

Orders to:
Melbourne House
131 Trafalgar Road
Greenwich London SE10

Correspondence to:
Melbourne House
Tring
Hertfordshire

Trade enquiries welcome

All Melbourne House cassette software is unconditionally guaranteed against malfunction.

Access orders can be telephoned through on our 24 hr ansafone (01) 858 7397.

MICROPOWERMICRO

THE MICRO POWER SPECTRUM

'ADD-ON'

Bring *'JOY'* to your Joysticks!!

Make your beeps ***BEEP!!***

BLADAMM!

Create Multi-Channel Sound Effects!!

BOOM

The new Spectrum Add-On gives you:

- ONE Atari/Commodore type Joystick Port
- TWO Potentiometer Joystick Ports
- Amplification of the standard sound output
- THREE-CHANNEL, PROCESSOR INDEPENDENT, PROGRAMMABLE SOUNDS — music, gun-shots, explosions etc
- Demonstration tape and full operating instructions

Note: The 'Add-On' simply plugs straight onto the back of your Spectrum. No soldering required.

Now offered at the incredibly LOW price of **£19.95** Incl. VAT (Please add 55p Post & Packing).

JOYSTICKS (Potentiometer-Type)
BUILT **£7.45** KIT (incl. case) **£5.95**

MICRO POWER

NOTE: We stock (and market) PROGRAM POWER SOFTWARE for the BBC, ACORN, SPECTRUM and DRAGON 32. Send S.A.E. for appropriate catalogue.

8/8a REGENT STREET, CHAPEL ALLERTON, LEEDS LS7 4PE.
Tel. (0532) 683186 or 696343

BBC, DRAGON & ACORN DEALERS

VISA

POWERMICROPOWER

BRIDGE MASTER

An audio course that will teach you to play bridge on your home computer.

"Bridgemaster really does bring the game alive for the beginner... is a far better medium for learning bridge than even the best teach yourself books."... Soft

"A really professional program for a microcomputer... For a learner this offering is ideal... One hundred percent value for money."... Home Computing Weekly

The package, prepared with world expert Terence Reese, contains commentary and computer tapes and a useful reference book – everything you need to learn bridge.

For the Sinclair ZX Spectrum 16/48K – **£24.95.** For the ZX81 16K – **£19.95,** ZX81 1K – **£19.95.**

Available from Boots,* WH Smith* and other leading computer stores or direct from Bridgemaster, FREEPOST, Dept. S3, PO Box 163, Slough SL2 3YY.

*Spectrum version only.
Prices include VAT, post & packing. Cheques & PO's should be made payable to Bridgemaster.

Put everything you need on the keyboard with a Custom Keypanel Kit.



Everything you need IS on the keyboard with CUSTOM KEYPANELS.

These precision die-cut plastic panels fit perfectly over your keyboard and provide an instant and individual reference to all of your software.

Each Kit comes in a clear plastic storage wallet and contains: 10 Matt-black Keypanels plus sheets containing over 140 self adhesive Command labels pre-printed with words, symbols and arrows, plus a sheet of blanks for your own designs.

SPECTRUM KEYPANELS are 96x224mm and the labels are printed in 'Spectrum' bright red. A MUST for flight-simulation and all multi-key games and applications.

The FIRST add-on for your Spectrum.

ORIC KEYPANELS are 105x275mm and the labels are 'ORIC' blue. Master those CTRL and ESC key combinations.

An INSTANT reference to all ORIC's keyboard functions.

NOW IN 'SUPER ML' PLASTIC!

Post today to **Softeach Limited**, 25 College Road, Reading, Berkshire, RG6 1QE. We despatch to you first class post by return.

Please send me:

.... Spectrum Keypanel Kits at £3.95 + 35p p&p each (overseas should add 25% for additional surface mail)

.... ORIC Keypanel Kits at £4.95 + 35p p&p each (overseas should add 25% for additional surface mail)

I enclose a total remittance of £ .... cheques/postal orders payable to **Softeach Limited.**

NAME ....

ADDRESS ....

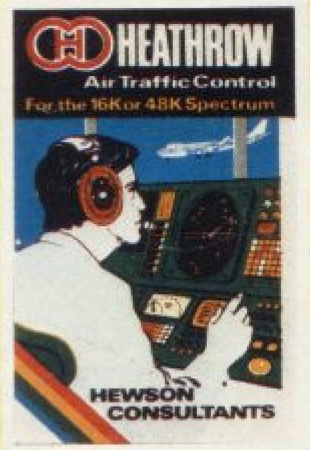
....

SU 5

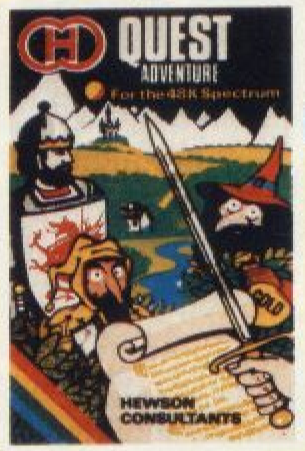
HEWSON CONSULTANTS

FOR SOFTWARE THAT CHALLENGES MIND AND DEXTERITY ... WHATEVER YOUR TASTE, WE HAVE SOMETHING FOR YOU

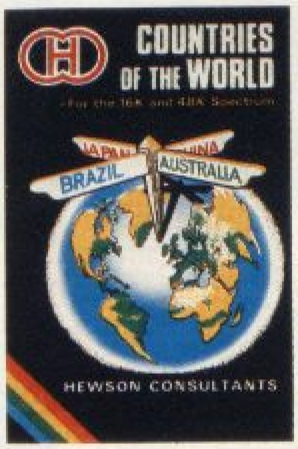
SPECTRUM



For the 16K Spectrum.
YOUR TASK: to direct incoming aircraft from holding stacks to runway – smoothly, safely and expeditiously.
YOUR INSTRUMENTS: Radar screen showing aircraft call signs, blips and trails. Four stack displays giving altitude, heading, speed and size.
SEVEN levels of play including a demonstration mode.
FEATURES: mixed aircraft, restricted airspace, minimum separation, outbound traffic, emergencies, unknown aircraft, radio failure, loss of a runway, instrument failure.



Find a map hidden in an inhospitable world inhabited by Dragons, Elves, Centaurs and other gruesome creatures. Role play the Wizard, Cleric Rogue, Fighter or Simpleton, each with different characteristics. Fight your way through the Gloomy Castle, Maze and Mountains etc, with weapons and Magic. Remember things are not always what they seem. For the 48K spectrum.



An educational package which gives an appreciation of the location of all the countries of the world. Includes two fully detailed world maps. 16K version – shows the location and names the capital. 48K version – All the above plus population, area, currency, main languages, etc and comparative statistics on the largest and smallest countries etc.



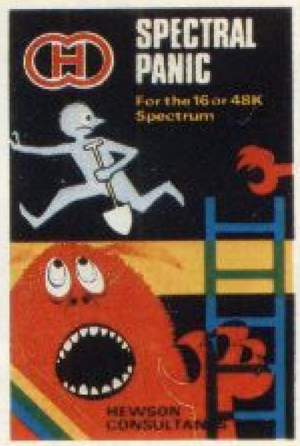
16K Spectrum. Defeat each squadron of Beeple Zaps and another appears only closer. Cyrian mothership with ejecting Zeetle Baps. 5 levels of play from Orions snail's pace to close your eyes and hope. Real time scoring. 3 lives. Pan galactic gargle blaster for highest score. Descending asteroids.



Fast and furious action. Joystick or Keyboard control. Locate the seiddab on your galaxy scanner. Scour the star studded blackness for your first sight of the enemy. Track their course and react rapidly as they try to break away. Let them grow in your sights and punch the fire button as they come into range.
16K or 48K Spectrum



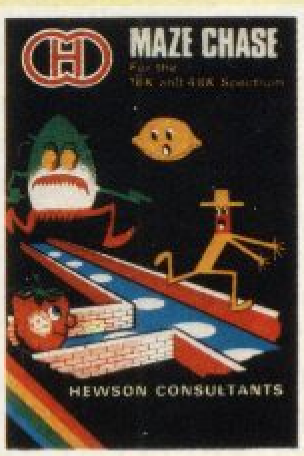
For the 16K Spectrum.
8 levels of play from novice to expert. Full colour display of tables and dice. Gamble on a single game or a series, double or quits. All the features of the ancient game.



A fast moving action packed arcade game. Climb the ladders, dig holes, bury monsters, eat the power pill, move fast to avoid being eaten. On screen scoring, 3 lives.
16K or 48K Spectrum



New all machine code version of our highly successful flight simulator. Now with perspective cockpit view, improved instruments, detailed map, four beacons and other enhancements. Multiple levels of play to develop your flying skills. Complete with printed flight debrief at the end of your flight – signed by the program author! The most realistic simulator on the market. 16K or 48K Spectrum.



For the 16 and 48K Spectrum, 4 or 12 mazes, highest score to date, 4 independent guardians, 3 lives, full colour, fast machine code action, magic strawberries, eat lemons to score more, real time scoring.





Making golden listings from the leaden Basic

Speed and smoothness of action is what everyone attempts to achieve in programs. John Gilbert reports on compilers

IT IS the dream of a Basic programmer to have a slow-running, jerky, Basic program turned instantly into machine code. That is possible using a compiler which will take a Basic listing and translate it into a form of machine code. The benefits are that the program instructions are less open to prying eyes and piracy. It also means that the programs will run faster.

Anyone who has some idea of how Sinclair machines work will appreciate that neither the ZX-81 nor Spectrum can read Basic code directly. They have to use a program called an interpreter which is stored in the ROM. That program translates Basic into a code which the machine will understand.

When you write a machine code program the need for the interpreter is removed. The interpretation of Basic takes up a good deal of time, so when no interpretation is needed the program will run faster. A compiler generates code which dispenses with the need for the interpreter.

Unfortunately none of the compilers on the market will translate all Basic instructions into machine code. The usual level of translation ranges from 90 percent to 95 percent.

Softek was the first company to produce a compiler and that was for the 48K Spectrum. Its main claim to fame was that you could speed graphics displays in programs. That it did very well and in so doing provided a facility which had not been seen on the Spectrum.

Like other companies which produce compilers, Softek upgraded its design of the compiler whenever it could. The company is in the process of launching two new compilers, one of which operates using integer Basic; the other is a great step forward in Sinclair computer compiler design, using floating point numeric representation.

An integer compiler allows the use of numbers only in the format 3, 56, 9. They will now allow you to use decimal points with numbers in a program. In some cases that proves to be a problem. For instance, you may want to perform some mathematical operations, such as division, which will leave you with a decimal number. The restriction in the compiler means that you will have to use INT to make sure that the computer can handle the numeric representation.

A floating-point compiler is a great step forward as it will allow you to use decimal notation when performing mathematical operations.

That will allow the programmer to use most of the commands in Sinclair Basic. Softek claims that it will compile up to 99 percent of Basic which, compared to other compilers, is very good. Unfortunately the floating point compiler is slower than the new Softek integer compiler. The difference in speed is not too noticeable but it is best to use the new integer compiler for graphics in games and the floating point compiler for the accuracy in calculations is needed by scientists and teachers. With the two products Softek has taken control of the market.

The second company to put a compiler on the market was PSS. It was called MCODER, of which versions for both the ZX-81 and Spectrum were developed. MCODER has since been upgraded and MCODER II is available. Both versions of the compiler are similar.

> 'A boon to anyone who can write Basic well but cannot master machine code'

The MCODER II is fairly representative of what is on the market and it is worth looking at the type of commands it will allow the Basic programmer to use. Unlike the early compilers, it can use numeric and string variables as well as arrays.

The restriction to their use, of course, is that only integer numbers can be stored in them. Another restriction, which is not too great for most applications, is that the range of numbers which it can use if from −32768 to +32767. Again that is as a result of the way in which the machine stores numbers.

Arrays have to be one-dimensional and you cannot use string arrays with the MCODER. That is unfortunate but you can circumvent it by using ordinary string variables.

The input instructions include both INKEY$ and the usual INPUT statements. For input in a program the READ, DATA and RESTORE instructions are available. The compiler will handle characters only within strings which have a code less than 32 and more than 164. That means you cannot put Basic keywords into strings.

By allowing the range of codes indicated, the compiler can handle user-defined graphics, with codes ranging from 144 to 164. You can define your shapes in the usual way, using decimal notation with USR or the BIN numbers.

Other display statements include DRAW and CIRCLE, with PLOT and OVER also included in the catalogue of legal Basic statements. PRINT and PRINT AT are also available, although AT is not included in the documentation. The TAB function is not available but can be replaced easily with PRINT AT.

Several program flow statements are also included in the compiler. They include GOTO and GOSUB. The IF . . THEN statement can also be obtained.

The FOR . . . NEXT loop structure can be used in the same way as in Basic but one restriction on it is that you cannot use a loop number which is greater than 32767. That also applies to other instructions in the compiler subset, including IF . . . THEN and RND.

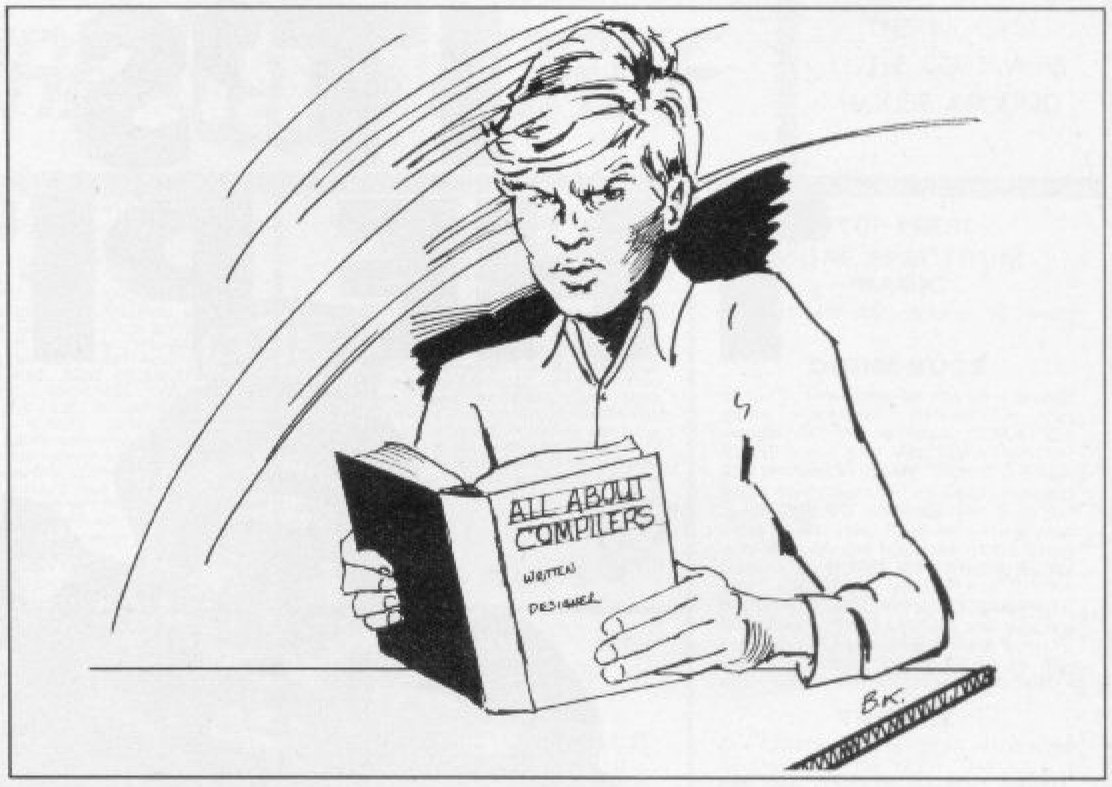
Even with all those restrictions you can overcome the problems and write almost any Basic application program.

All the compilers on the market stress ease of use and that is true. For instance, there are three ways of operating the MCODER. The first is to load the

compiler and enter your program by hand. After it is finished you can run the Basic to see if everything is working and there are no bugs. After that a quick machine code call will compile the Basic, which can then be run by a RAND USER 40000. The code can be moved round in memory if necessary but 40000 is the default location for the start of your routine.

You can load a Basic program from tape if you have one already developed and do not want to re-type it. To do so you must LOAD the Basic in the normal way after loading the compiler.

The third type of compilation allows you to translate two Basic programs into machine code in the same session. To do so, you will have to move RAMTOP and stack one program on top of the other. The two programs can then be called by separate USR instructions.



When you have told the computer to compile, one of two things can happen. You can either get an error code or you will get the OK signal.

If an error has been detected in your program, the MCODER will return your program listing with an 'S' beside the line which could not compile. It will then allow you to change that line and re-compile the code.

If you have had no difficulty you can invoke your program using USR to see that it runs faster than in Basic. You can then SAVE it to tape by following the easy-to-read but not over-long instructions.

The effect of the compiler on the code is more marked in some instructions than others. The CIRCLE and DRAW commands are not much faster than in Basic, although if you draw sufficient circles you should see the speed compared to Basic.

The real effects of the compiled code will be noticed when you use FOR . . . NEXT loops and the other structural statements which affect the flow of a program. The speed in some cases is unbelievable when you think that the code used to be in Basic.

A compiler is a boon to anyone who can write Basic well but cannot master machine code. Unfortunately, the compilers in the Sinclair market and elsewhere incorporate some of the manufacturers' code into the code of a program when it is compiled.

That means that some of the manufacturer's program would be in your program and as a result you could not make a profit from your program without giving credit, and perhaps a royalty, to the software house which created the compiler.

Companies which produce compilers for more expensive computers, such as the Apple II, charge a hiring or rental fee for those utilities. In that way they receive money for any program which contains some of their compiler routines.

Unfortunately things are not so simple in the Sinclair market. It would be uneconomical to charge for compilers in that way, since mass production would mean keeping track of thousands of programs.

'Companies which produce compilers for more expensive computers charge a hiring fee for those utilities, but that would be uneconomical in the Sinclair market'

The initial stand was to insist that it would market programs which it thought were good and where the compiler was used. In no other cases could companies use the compiler without consultations.

At the time that was a difficult but necessary move, as there was, and still is, no clarification of the law of copyright regarding software. Softek has since softened its objections to the use of its compiler for profit and asks that companies which produce games using it credit Softek on the program and cassette insert.

Compilers are useful instruments both to individuals and to software companies but the legal difficulties about their use still exists. Compilers become more complex and, as a result, companies which produce them will want to protect their interests from the usual type of piracy and the use of a compiler without consulting manufacturers.

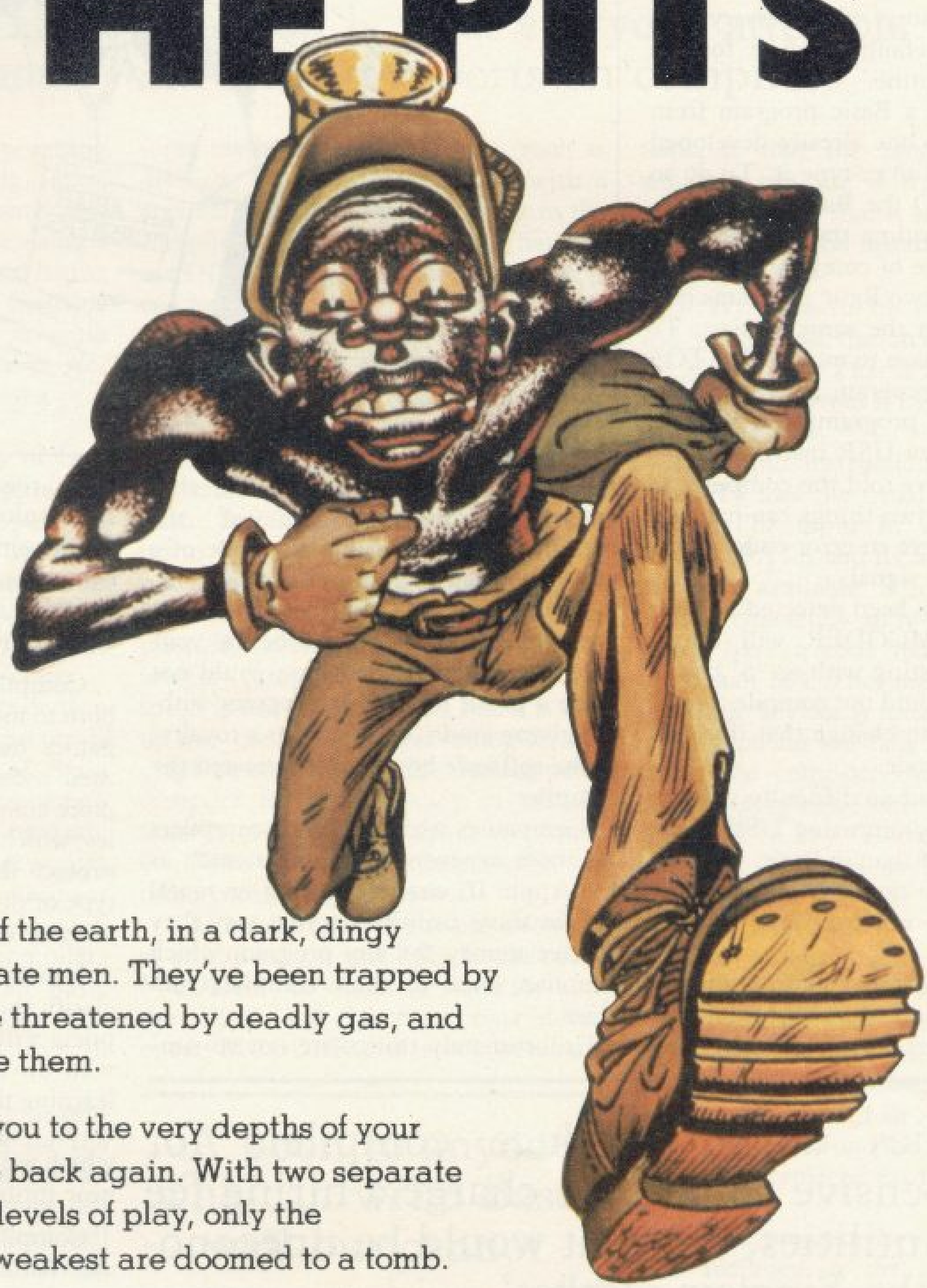
It will need a change in the law to clarify the position but until then compilers will be of most use to individuals who do not want to take the step of learning to program in machine code. It is an unfortunate restriction of use which will need to be investigated in the near future.

Compilers are useful to the individual. Although they do not provide a complete translation from Basic to machine code they will still help anyone who does not want an assembler or to learn assembly code.

It may also provide an incentive to learn machine code programming techniques because of the speed at which it will make a former Basic program work. In the next few months we could see a 100 percent Basic compiler but until then we will have to work with what we have.

Softek, 12–13 Henrietta Street, London WC2.
PSS, 452 Stoney Stanton Road, Coventry CV6 5DG.

IT'S THE PITS



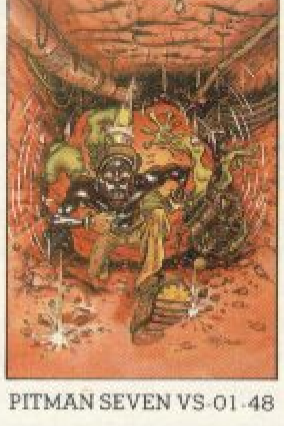
Deep in the bowels of the earth, in a dark, dingy mineshaft, lie 14 desperate men. They've been trapped by vicious rock falls, they're threatened by deadly gas, and it's your mission to rescue them.

Pitman Seven takes you to the very depths of your imagination and maybe back again. With two separate attack waves and three levels of play, only the strongest survive. The weakest are doomed to a tomb.

Pitman Seven. It's tough, it's challenging. And it's yet another great game from Visions. The ultimate name in video games.

Visions

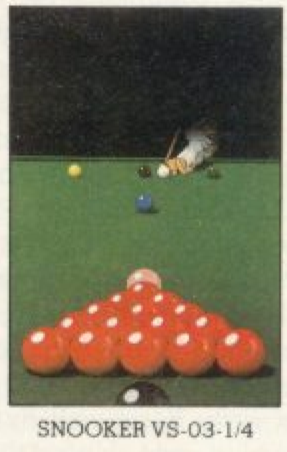
FANS PLEASE NOTE! ALSO AVAILABLE MAIL ORDER FROM VISIONS (SOFTWARE FACTORY) LTD
1 FELGATE MEWS, STUDLAND STREET, LONDON W6



PITMAN SEVEN VS-01-48



SHEER PANIC VS-03-16



SNOOKER VS-03-1/4

PROGRAMS WANTED

SPECTRUM DRAGON BBC ZX81

WORK FORCE

THE BIGGEST LITTLE SOFTWARE HOUSE AROUND



DO NOT PASS GO

Now the SPECTRUM VERSION IS READY

D.N.P.G. is a complete simulation of THAT BOARD GAME you know PARK LANE and all that. Up to SIX PLAYERS can compete with the MICRO doing all the work. Acts as DICE THROWER, BOARD, RENT COLLECTOR, UMPIRE, BANK, RULE BOOK, ACCOUNTANT, ESTATE AGENT and ASSET RECORDER. SUPERB GRAPHICS by GARRY KENNEDY (thanks mate). GAME SAVE with winner so far report. Complete with full instructions. The ULTIMATE in FAMILY GAMES. DON'T MONOPOLISE YOUR MICRO. AMAZE your friends and family. (Can you imagine your GRANNY on a MICRO?). A 16k ZX81 version also available. 48k SPECTRUM or 16k ZX81 versions **ONLY £6.95**.

YAHTZI 48K

48k SPECTRUM. All ELECTRIC VERSION of the classic dice game of STRATEGY. More CHUNKY graphics from GARRY KENNEDY. No extras required up to SIX PLAYERS can compete, or practise if you wish. SPECTRUM acts as UMPIRE, SCORE SHEET and DICE THROWER. Update your games cupboard for just **£5.50**. 48k only.

UP TO 6 PLAYERS £5.50

STOP PRESS MORE SPECTRUM MAGIC

No time for the pictures all ready now!!!!

DOOM BUGS

We vote this game as the best arcade game submitted. REMEMBER that comfortable feeling when "IT ALL FELT RIGHT" and that ANTICIPATION before each NEW GAME. Well IT'S BACK and it really does FEEL GOOD. Trapped in GRUBBER'S LAIR the aim is to escape to the next level by eating your way through the trapdoor whilst being pursued by BUGS, BUBBERGRUBBERS and GRUBBER HIMSELF. GREAT GRAPHICS, AGF JOYSTICK COMPATIBLE, FAST, TWO LEVELS and you are not going to believe how much fun it is. PRO-ARCADERS ONLY £5.50 for 16-48k version. ABSOLUTELY MAGIC!!!

TRIPLEX

Our CONTENDER for BEST PROGRAM GRAPHICS of the YEAR. TRIPLEX a 3 part game featuring the BEST GRAPHICS YET!!! MOONSHINE ALLEY, a LOW gravity ASTEROID belt in HIGH RES SPLENDOUR. CAKEWALK a SLICE through a RAINBOW VORTEX. ALIEN ALLEY a fight to the DEATH with the HUNTER KILLER SHIPS. A PRO-ARCADE game with a difference. MORE skill than PACE. STATE OF THE ART GRAPHICS. £5.50 for FREE VIEWING.

ENIGMA

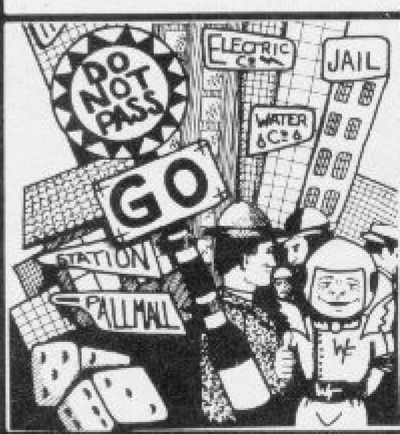
This one's for THINKERS ONLY. Based on the BLACK BOX principle a game with PURE RULES and requiring a high degree of REASONING and DEDUCTIVE SKILLS. Each game lasts HOURS and becomes PROGRESSIVELY more DIFFICULT. It's a PUZZLE why it's so CHEAP at £5.00.

PIRATE ISLAND

WANTED ADVENTURE FREAKS. Join forces with THE PIRATE and search the ISLAND for the TREASURE. A FAST RESPONSE program ABSOLUTELY NO RANDOM FEATURES. Can you trust a PIRATE. There's BUT ONE WAY to FIND OUT. FOR £5.50 you get a whole ISLAND full of TREASURE, TRAPS, RED HERRINGS and many hours of FRUSTRATING FUN. A TRADITIONAL ADVENTURE. 48K ONLY.

THE WINGED AVENGER

Fast and furious. Two versions of the same game on the SPECTRUM tape,, the original and the NEW VERSION. SOUND, GRAPHICS, SEVEN SKILL LEVELS. Full ARCADE ACTION including THREE WAVES OF ALIENS, HIGH SCORE, REFUELLING, RAPID REPEAT FIRING, SMART BOMBS and LASER SHIELD. P.C.W. "ONE OF THE BEST SINCLAIR GAMES YET". HOME COMP WEEKLY "FOUR STAR WINNER". 16k ZX81 VERSION "PROBABLY THE FASTEST ZX81 GAME". NOTED as EXCELLENT by the INTERNATIONAL BUREAU OF SOFTWARE TEST. 16k ZX81 & 16 + 48k SPECTRUM VERSIONS AVAILABLE. **NOW £5.00.**



NEW RELEASE "JAWS REVENGE" 48k SPECTRUM

Disappointed with his box office returns JAWS brings his GORY EATING HABITS to the SPECTRUM in his very own ARCADE GAME. JAWS eats his way through a mixed diet of DIVERS, BOATMAN, JELLYFISH, SWIMMERS and FISH. You control JAWS in this FAST MOVING trail of carnage. Avoid DEPTH CHARGES, EXPLODING JELLYFISH, HARPOONS, ARMED SCUBA DIVERS and EAT everything you can. 5 LIVES, SCRAMBLE type SEA BED, current and HIGH SCORE. ALL MACHINE CODE and FAST, DEMO SCREEN. BONUS LIVES. FASTER GAME FOR 10,000 POINTS. WREAK HAVOCK ON THE HUMAN RACE. "THE BEST GAME YET" ANIMAL RIGHTS MOVEMENT". 16 & 48k SPECTRUM **£5.00.**

MATCALC 16 & 48k SPECTRUM

This is our SPREADSHEET PROGRAM with a difference. This ONE has the option of the standard display or a 64 CHARACTER per LINE display or printout. Ideal for WHAT IF, CASH FLOW PROJECTIONS, and analysing related figures. FORMULA may be MATHEMATICAL or LOGICAL. MENU DRIVEN. SAVE and LOAD to TAPE. FULL instructions and TWO matrices on TAPE with a full explanation of their formation. P.C.W. "MORE FLEXIBLE overall than . . . ". Both the 16k & 48k versions on ONE TAPE. SIMPLY HUNDREDS OF USES. **JUST £7.00.**

"SHIFTY" 48k SPECTRUM

A WORD PROCESSOR FOR THE SPECTRUM. "SHIFTY" was designed to overcome the limitations of the standard SINCLAIR HARDWARE, specifically the PRINTER. Using the STANDARD PRINTER all output over 32 CHARACTERS PER LINE is PRINTED SIDEWAYS allowing pages to be formatted from the printer paper. Any width from 20 to 80 characters per line may be specified. Text can be viewed prior to printing and can be JUSTIFIED to the RIGHT MARGIN. SHIFTY will WORD SEARCH, MOVE PARAGRAPHS, SPLIT PARAGRAPHS, APPEND PARAS, SAVE and LOAD from TAPE, INDENT PARAS and allow standard PHRASES to be STORED and accessed from DATA STATEMENTS using DEFINED KEYS. EDITING is ON SCREEN using 4 way CURSOR MOVE. SHIFTY comes complete with a sample letter and full instructions. Requires ZX printer. **ONLY £7.50.**



WORK FORCE GIVE-AWAY

3 WELL REVIEWED MACHINE CODE ARCADE GAMES on one tape as a SAMPLER. HIGH NOON and BASE INVADERS were rated as the best versions available and SCRAMBLE even beat the reviewers when they tried it.

BASE INVADERS

THREE SPEEDS the fastest INVADERS. HIGH SCORE and SHIELD AVAILABLE if you CAN'T HANDLE the ACTION.

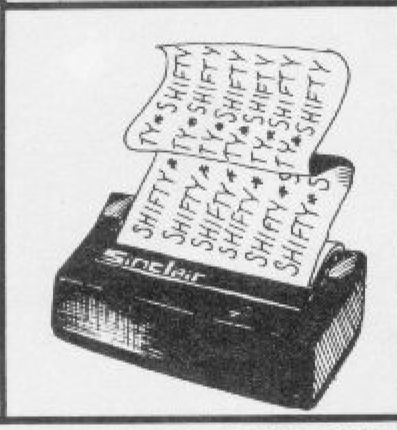
HIGH NOON

SMOOTHIE GRAPHICS, FAST ACTION and GOOD SOUND. The best COWBOY SHOOT OUT.

SPECTRUM SCRAMBLE

EIGHT DIRECTIONAL MOVEMENT. LASERS, BOMBS, ROCKETS, INSTANT RESPONSE, CONTINUOUS SCORING, SOUND, FUEL DUMPS, RED METEORS, DEFENDER CRAFT and HIGH SCORE. Classic arcade action.

Three PRO ARCADE GAMES worth £13.95, yours for £6.50. LESS THAN HALF PRICE. THE BEST VALUE EVER FOR 16 & 48k SPECTRUM.



DISPLAY

How would you like 273 different USER DEFINED GRAPHICS on a 16k SPECTRUM or a FULL 336 on a 48k. All can be displayed on screen at the SAME TIME. U.D.G's are stored as PAGES and any two pages may be EXCHANGED in MEMORY. FILES may be SAVED or LOADED from TAPE at a USER specified location. TURN a UDG one quarter or half turn. FLIP a UDG over, REVERSE a UDG, EXPAND a quarter UDG into a FULL CHARACTER. MOVE a UDG one PIXEL at a TIME, UP, DOWN, LEFT or RIGHT. FIVE complete TAPE FILES are INCLUDED on tape ONE CONTAINING a 64 CHARACTER DISPLAY. DESIGN GRID for constructing CHARACTERS and SHAPES. FULL INSTRUCTIONS and ANIMATED DEMO SCREEN. **£7.00.** 16 & 48k SPECTRUM.

PROGRAMMERS DREAM

16k or 48k SPECTRUM.

An advanced SPECTRUM TOOLKIT. Comprised of just 1450 BYTES of POSITION INDEPENDENT MACHINE CODE. RENUMBER lines or blocks. Allows START, FINISH, INCREMENT and new START to be defined. BLOCK or line MOVE including RENUMBER to fit available GAP. RENUMBER will renumber ALL GOTO, GOSUB; LIST etc without further action. CHANGE strings (NAMES or CONTENTS. DUMP VARIABLE NAMES and CONTENTS to DISPLAY PROGRAM SIZE with or without VARIABLE SIZE. This package is FAST, CLEAN, PRODUCES ERROR MESSAGES and is WELL DOCUMENTED. S.USER "WORKS LIKE A DREAM" SPECTRUM ONLY **£6.95.**

ZX-81 16K USERS IMPORTANT ANNOUNCEMENT

WORK FORCE now appointed as U.K. distributor for VENTAMATIC SOFTWARE of SPAIN. 6 of the BEST PRO-ARCADE games LAUNCHED NOW!!. SPECTRUM FOLLOWS. "STATE OF THE ART" for PRO-ARCADERS ONLY. Special launch offer each TAPE contains 2 MACHINE CODE MASTERPIECES for JUST £4.50. NO RUBBISH.

DANGER TRACK

RACE a CAR through a maze 30 times larger than screen. Collect 10 FLAGS, BEWARE 5 ATTACKERS, THROW SMOG BOMBS. ON SCREEN RADAR MONITORS WHOLE MAZE. SPECIAL RESOLUTION.

AND

BUMPER THUMPER

PURSUED by the CHASER you have to PUSH the THUMPERS off SCREEN. All BLOCKS are SLIDERS but don't go near the CHASER or you get "YOUR BUMPER THUMPED" GOOD GRAPHICS.

PHANTOMS

PHANTOMS a HAND CRAFTED version of "...MAN" TWO LEVELS of PLAY. THREE MAZES, ENERGY DOTS, POWER PILLS, FRUITS, FOUR GHOSTS, ESCAPE CORRIDORS, and GREAT GRAPHICS. PRO-ARCADERS only NO FUMBLERS.

AND

CASHBOOT

A MANIC BOOT driven relentlessly by MACHINE CODE. LEAP from square to square knocking out FLAGS. BEWARE the BOOT crashing around. One false move and it's "cobblers" for you. SPECIAL GRAPHICS, HIGH SCORE and several screens.

SPACE BATTLE

PURE MAGIC. Complex 3D GRAPHICS. Unlimited galaxy. STARFIGHTERS attack at SPEED in 3D. 3 Keys GIVE 8 directions. 4 to 6 IMAGES per SECOND. 9 to 10 depth PLAINS. The BEST RESOLUTION at THIS SPEED. YOU HAVEN'T SEEN A PROGRAM THIS GOOD.

MOONLANDER

CLASSIC ARCADE GAME only this one's for PROS ONLY. 2 STAGES of RESOLUTION. SELECTABLE LEVELS of GRAVITY. MACHINE CODE gives instant CLOSE UP of LANDING. PRECISE CONTROL AND FINE GRAPHICS. The HARDEST YET. NO BEGINNERS PLEASE.

WORK FORCE

140, WILSDEN AVENUE
LUTON BEDS.

Post Included

odyssey COMPUTING

HIGH RESOLUTION ZX81 PROGRAMS

We utilise a SOFTWARE ONLY technique developed by Steve Briers BSc to produce a stable 248 by 224 pixel display. ABSOLUTELY NO HARDWARE MODIFICATIONS ARE REQUIRED for the following programs:

INVADERS — reviewed ecstatically in 'ZX Computing' — "the Hi-res display really does break new ground . . . an excellent game . . . an outstanding achievement . . . As well as the Hi-res display the facilities offered are impressive" ← Need we say more!?

SWARM — a fast moving arcade-type game. Shoot down saucers as they dart across the screen firing their missiles. Progressive difficulty.

ZORF — an advanced arcade game incorporating five different sheets: — INVADERS, GALAXIANS, ZORFIANS, METEOR STORM, & MOTHERSHIP; progressive difficulty.

GRAPHICS — enables you to use high resolution graphics in your own programs. The commands are: CLS, PRINT, PLOT, POKE, DRAW, SPRITE & SCREENOFF. Comprehensive editing facilities are provided and the graphics commands are easily incorporated into BASIC programs.

CAVE CRUSADE — please note that this does not use high resolution graphics, however, the normal graphics are used to good effect. This is a fast moving game in which the player must escape from a cave whilst being persued by its ferocious inhabitants.

NEW! — FOR THE 48K SPECTRUM

SPECTRUM ZORF — similar to our ZX81 program but using colour and sound. This is in fact five games in one, as the player can choose to play one sheet continuously if so desired.

CHILD'S PLAY — designed as a teaching aid for pre-school children with the participation of a parent or teacher. Excellent use made of the Spectrum's colour graphics makes this an enjoyable program to use.

(We are constantly looking for quality Spectrum software for which we pay up to 33% royalties. If you've written such a program then send a sample to us for evaluation. Trade enquiries are welcome).

Send this coupon to ODYSSEY COMPUTING, 28 BINGHAM ROAD, SHERWOOD, NOTTINGHAM NG5 2EP. Tick the programs you require.

Invaders	£4.95
Swarm	£3.95
Zorf	£5.95
Graphics	£5.95
Cave Crusade	£3.95
Spectrum Zorf	£5.95
Child' Play	£5.95

I enclose a cheque/postal order for £ .... made payable to ODYSSEY COMPUTING.

NAME ....

ADDRESS ....

....

New Low Prices

SPECIAL OFFER available to 30th November or whilst stocks last.

SPECTRUM GAMES 16 or 48K

Jet Pac	£4.99
Cyber Rats	£5.50
Black Hole	£4.99
Invaders	£4.50
PSSST	£4.99
Slippery Sid	£5.50
Tranzam	£4.99
Planet of Death	£6.50
Jumping Jack	£4.99
Light Cycles	£4.50
Violent Universe	£4.99
Cookie	£4.99
E.T.X.	£5.50
Arcadia	£4.99
Nightflite	£5.50
3D Tunnel	£5.50

48K only

Hobbit	£13.99
Mad Martha	£6.50
Penetrator	£6.50
3D Combat Zone	£5.50

IMPORTANT

Your discount vouchers are still valid. Existing customers can now save up to £1 a game.

NEW! THE ZX PRINTOUT BINDER

Special introductory offer: 1st 200 at only **£4.99** plus £1.00 postage and packing. A smart 4 ringed red leatherette binder custom built for your printouts. Complete with 5 heavy gauge clear PVC sleeves. Additional sleeves in packs of 10 at £2.99 plus 50p postage and packing.

Binder ☐ **Sleeves** ☐

See us at the 9th ZX Microfair.

Send cheques or P/O's to (no stamp needed):

K-ram,
Freepost,
Rainham,
Essex RM13 7BR

Name ....

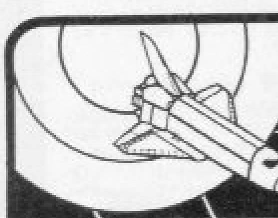
Address ....

....

....

k-ram

J. K. GREYE ENTERPRISES LTD



NEW



FOUR STAR

16/48K SPECTRUM

includes games to suit all ages, from 5 to 105

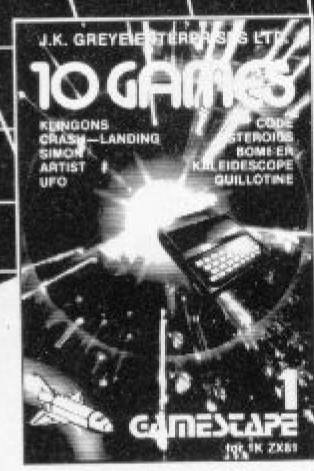
INVASION: Our version of the Classic Arcade Game surely one of the best around. Includes Full Colour High Res. Graphics, Sound and it's incredibly fast at the end.

KAMIKAZE: If you like Scramble, you'll love this. 16 levels (long ones at that), of tortuously twisting caverns. Missiles, Starmines (which move in between games, so it's never the same next time around), Bases, Fuel Dumps (watch you don't run out of fuel!), and two speeds (difficult and impossible). Definitely a game for those amongst you with a suicidal tendency, when playing games, because you can score even when you crash! (If you can make it past level 8, write and let us know, 'cause that's as far as we've managed!)

MINEFIELD: A totally new game, in which you have to lay mines in a forest. Sounds simple doesn't it? But, once you start, you can't stop and there lies the rub (or to be more exact the explosion!). Guaranteed to get your fingers in a twist!

UFO: Dodge the Asteroids, blast the Alien Craft and work off your aggressive instincts on the keyboard. Gets progressively more difficult the longer you last!

All of these for only **£4.95**

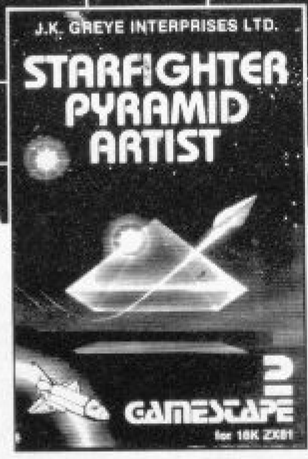


GAMESTAPE 1

1K ZX81

10 Games incl. ASTEROIDS, UFO, CODE, BOMBER, GUILLOTINE, KALIEDESCOPE, etc.
PROBABLY THE BEST VALUE 1k TAPE AVAILABLE.
We've done it 1k games which some of our competitors require 16k to do!

only **£3.95**

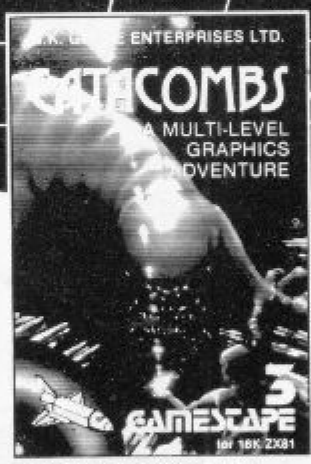


GAMESTAPE 2

16K ZX81

***STARFIGHTER** Superb machine code Space Battle, set against a background of twinkling stars, with stunning explosions - if you can hit the enemy!
PYRAMID Can you move the Pyramid? Make a mistake and it will collapse! A thinkers game.
ARTIST The ultimate Graphic Designers aid. 8 Directions, 10 Memories, SAVE, COPY, RUBOUT, CLS, etc.

only **£3.95**

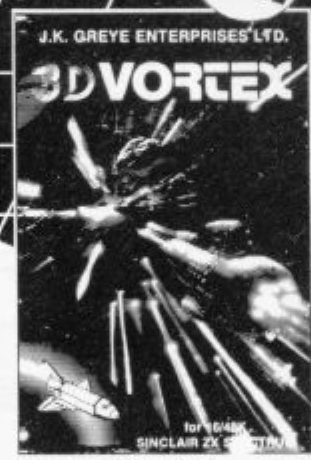


GAMESTAPE 3

16K ZX81

***CATACOMBS** A Multi-Level Graphics Adventure. Each level can contain up to 9 Rooms, 8 Passages, 7 Monsters, Food, Gold, Traps, Phantoms, an Exit (to the next level), and there's an infinite number of levels.
NOTE — This is NOT one of the necessarily limited text Adventures as sold elsewhere.
"An excellent addictive game which will keep you engaged for hours" ... COMPUTERS & VIDEO GAMES

only **£4.95**



3D VORTEX

16/48K SPECTRUM

After a successful warp transfer, you drop your craft below light speed, only to discover you are caught in the irresistible gravity well of a giant Neutron Star. You are dragged past the Event Horizon, and then the fun really begins! Gravitic Tidal pressures have created a mind boggling Vortex through the tortured supra-matter of the Neutron Star. And guess who's caught in it? The onboard Navigational Computer copes for a while, but what mere machine can withstand the awesome forces inherent in such an anomaly. Soon the Nav.-Com. will cease functioning, and then (of course), it's all down to you.

Are you capable of "seat of the pants" flying, it won't be easy? Not only does the Vortex twist and turn, like some demented worm, but your Tau-Sigma Shield will only withstand 10 contacts with the boundary layer. And, as if that wasn't enough, you have to dodge, or laser, the Octoplasms, Droids and Sirius Class Battlestars, Best of luck! You'll need it!

Features
Stunning 3D Graphics.
Full Sound Effects.
High Speed Machine Code Animation.
Full Instructions.
Choose your own Control Keys.
Compatible with most Joysticks.

only **£5.95**

If you prefer to see before buying, our range of Gamestapes are stocked by W.H. Smith, John Menzies and good computer stores Nationwide.

SOFTWARE SUCH AS DREAMS ARE MADE OF

Please tick boxes of required tapes:

3D VORTEX	at £5.95 ☐
FOUR STAR	at £4.95 ☐
GAMESTAPE 1	at £3.95 ☐
GAMESTAPE 2	at £3.95 ☐
GAMESTAPE 3	at £4.95 ☐

All software sold subject to the condition that Hiring, Lending, Unauthorised copying or Resale is Strictly Prohibited

Send your order to:
J.K. GREYE ENTERPRISES LTD.
16 Park St. Bath BA1 2TE

Name ....

Address ....

....

.... Postcode ....

I enclose a cheque/p.o. for £..................
made payable to **J.K. GREYE ENTERPRISES LTD.**

TRADE & EXPORT ENQUIRIES WELCOME

fantasy

The battle could be yours.....
.....but it won't be easy!

PARTICIPATION – that is the name of OUR game. All our software contains a unique score verification mechanism allowing us to add a new dimension to computer games. Every July and January we will be publishing a ranking list of the top 1000 scorers in each game with the overall top 100 'grand masters' each receiving certificates of merit bearing their position.

September is the last month to qualify for the Black Hole championship. However, from October the sender of the highest valid score each month will win software of their own choice to the value of £50.

The Black Hole is a technicoloured confection of special effects...very demanding; magnificent graphics. (Soft) The explosion effects are some of the best we have seen. ...(Sinc User)



Totally original game plan. Addictive, challenging and offering a complete visual experience with its animated graphics and violent explosive effects. Compatible with ALL leading joysticks.



If you are looking for something that keep you up all night, cause you to pu your hair out, send you mad with its trickery, then you really shouldn't miss this game.
The mystery of "THE PYRAMID" won't take you a few days to solve, it will probably take you a few months.



FANTASY SOFTWARE is available from W.H.Smiths, John Menzies and Computers For All

FANTASY...
...a name to remember

ASK FOR FANTASY SOFTWARE at your local SOFTWARE RETAILER

All games are obtainable at £5.50 each from FANTASY SOFTWARE, FAUCONBERG LODGE, 27A ST.GEORGES ROAD, CHELTENHAM, GLOS GL50 3DT despatched by return first class post together with a membership number entitling you to discount on our forthcoming blockbusting software.

Trade Enquiries welcome – telephone 0242-583661

THE FULLER BOX

The Sound System for the Spectrum

The FULLER BOX added to the ZX Spectrum, improves the sound quality enormously. The built-in audio amplifier working well with all SPECTRUM programs.
The FULLER BOX allows you to program your own music, explosions, zaps, chimes, whistles and an infinite range of other sounds. Based around the popular G1-AY-3-8912 sound chip. It gives you complete control over 3 channels of tone and/or white noise, plus an overall envelope control.
Also provided with a joystick port, the unit gives instant command over all your own games programs. The port is compatible with all the commercially available joysticks eg. Atari/Commodore.
The FULLER BOX is complete with full documentation and a demo tape which includes the type of sounds you can achieve. It also allows you to program your own sounds. Fitting neatly onto the back of the SPECTRUM, the FULLER BOX still allows access for other peripherals, including the new SPECTRUM Micro Drives, via its duplicate user port.
Certain Imagine, Arctic and A&F games now with speech and sound effects.



£29.95 (inc. VAT)+ 80p P&P

The Fuller Experience.

Firmly established in the development of computer hardware, the acknowledged leaders in their field, the vast range of Fuller experience is available to you through their comprehensive selection of accessories. This ever expanding range makes Fuller the natural extension for your Computer.



£39.95 (inc. VAT) +£2.50 P&P

THE NEW FDS for the SPECTRUM, ZX81, LAZER 200, JUPITER ACE,

This elegant desk top system, designed for the professional user. In its slimline case, the superior keyboard contains all the graphic characters for the above computers. With the additional function keys and SPACE-BAR, speedy and accurate data entry is made simple.
The Fuller FDS is easy to install, based on the very popular FD42 system, it requires no soldering or technical knowledge. For the user who is reluctant to install his computer circuit board inside the FDS a buffer is available (£9.75 + 80p&p) which simply plugs onto the expansion port and connects directly to the keyboard.

The Fuller Orator – Speech for the Spectrum

A smash hit at a number of recent Micro Fairs, the FULLER ORATOR uses an allophone system. Based on the G1-SP0256 AL voice synthesiser chip. Directly accessable in BASIC, it is able to say anything you command using the keyboard or a games program. It comes in the standard case complete with its own audio amplifier, it allows access to the SPECTRUM for other peripherals via its duplicate user port. Full documentation and demo tape included.

PRICE (inc. V.A.T.) **£39.95** plus 80p p&p.

THE MASTER UNIT — The Ultimate Games Unit

The Master Unit provides all the requirements for the serious gamesenthusiast, containing not only the FULLERBOX, but also the FULLER ORATOR, all contained within the standard case. The Speech Unit and sound synthesiser combines to provide exciting voice and sound for your games. The other features include, Cassette interface, a variable audio output which may be connected directly to a HI-FI system. The MASTER UNIT provides endless scope in applications, and it allows access to the SPECTRUM for other periferal, via its duplicate user port, i.e. printerface. The MASTER UNIT is complete with full documentation and demo tape which includes the type of speech and sound you can achieve.

£54.95 (inc. VAT) + 80p P&P

MICRO SYSTEMS
Fuller

FULLER MICRO STSTEMS
The ZX Centre, Sweeting Street,
Liverpool 2. Telephone: 051-236 6109

Fuller Quality
Fuller Micro Systems reach for the highest quality in Research and Development, to make our products the BEST.

Fuller Service
In an effort to provide the best service we have built a new MAIL ORDER dept. at 71, Dale Street, Liverpool 2. Due to come into service soon.

Fuller Guarantee
All our products carry a worldwide one year guarantee.

FULLER stock a full range of components and kits for your, computer, send SAE for details.

Please supply the following items: (state items and quantity) SU11
plesase send me .... @ £..........
please send me .... @ £..........
please send me .... @ £..........
please add £..................for p&p
I enclose a cheque/PO payable to
FULLER MICRO SYSTEMS Total £ .... or debit my Access/
Barclaycard – Card No. [ ]
Signature ....
Name ....
Address ....
DEALERS REQUIRED FOR UK & ABROAD
ENQUIRES WELCOME
051-236 6109
71, DALE STREET, LIVERPOOL 2

Adaptor opens up the Micronet world

Spectrum users can now take advantage of a growing database. Stephen Adams reports on the hardware which makes it possible

THE PRISM VTX 5000 modem has been designed to give Spectrum users access to the Micronet 800 closed-user database on Prestel. It consists of a flat, black box slightly bigger than the Spectrum on which the Spectrum rests, connected to the modem via a three-plug ribbon cable. The cable connects the Spectrum and modem and provides an expansion connector for other peripherals like the printer. If you are using Interface 1, connect it to the interface connector.

On the front of the modem are two switches and two LEDs. The red LED is the power-on light and the green LED indicates to the user that the modem is connected via the line switch to the telephone line. The second switch allows you to select the mode to be used — Micronet terminal, half-duplex transmitting terminal with echo, or receiving terminal. The Micronet terminal works at 1,200 baud receive and 75 baud transmit to Prestel. The other terminals work at 1,200 baud both ways.

The connection to the telephone line is via a new-style jack plug and socket fitted by British Telecom. At present the cost of fitting it is being included in the price of the adaptor. The telephone is fitted with a plug on the end which plugs into the back of the modem or the wall socket.

The modem is approved by British Telecom but has no auto-dial facility, so the telephone must be used to dial the Prestel computer before the modem is switched-in. As long as the LINE switch is in the correct position it will not effect the use of the telephone and the unit can be left connected all the time.

The unit has two printed circuit boards, one to interface to the microcomputer and one containing the modem and isolation circuitry. The modem is a Texas one-chip modem type TCX3101 controlled by a 4.4MHz PAL colour frequency crystal. It has two amplifiers between it and the line and provides various handshaking signals to the communications interface chip via a 10-wire interface cable.

The board also contains an isolation transformer and a reed relay to hold a telephone call when the handset is replaced on the telephone.

The Spectrum interface board contains an 8251 communications chip, 8K EPROM, baud rate oscillator and various decoding chips which allow it to switch-out the 16K Sinclair Basic ROM and replace it with its own.

Various speeds are available, the RS232-type interface being marked from 75 to 2,400 baud, but the board is connected to work only at 1,200 or 75 baud. The chip is operated by a 0 on bit 7 of an I/O address but checks the lower five bits to see if a Sinclair device is requested. That may affect some other devices like joysticks, which also use that method of addressing.

> 'Instructions with the packages are simple and easy to understand'

On powering-up the modem and Spectrum — the modem is powered from the Spectrum via a voltage regulator by turning it on at the mains plug — the modem switches in the 8K EPROM and loads a Basic and machine code program from the ROM into RAM. It also loads a new Prestel graphics set above RAM TOP. A warning is printed in the front of the manual about not powering-up by plugging-in the power socket to the back of the Spectrum when using Interface 1 — the Microdrive interface. Do not ignore it as some damage may occur if you do.

The Basic program then RUNs and presents the user with the Micronet 800 logo, which also gives the software version number and date. Pressing a key will then get you on to the main menu, one of five used to control the system.

That gives seven functions and is returned to for SAVEing and LOADing software from Prestel, saving, printing or viewing frames — each page is called a frame — entering other menus or entering or leaving Prestel.

Option one lets you log-on to Prestel after inserting your identity number and password into the computer. That may be done before or after obtaining Prestel. The number is issued by Prestel via Micronet and is the one by which you are charged, so do not let anyone else have the number or they could incur large bills which you would have to pay.

To contact Prestel dial the number for the local Prestel computer — it will always be a local number to save cost to the user — and wait for the computer to answer with a high-pitched tone. Then throw the line switch on the modem and replace the handset on the telephone; that prevents noise from the telephone corrupting the data.

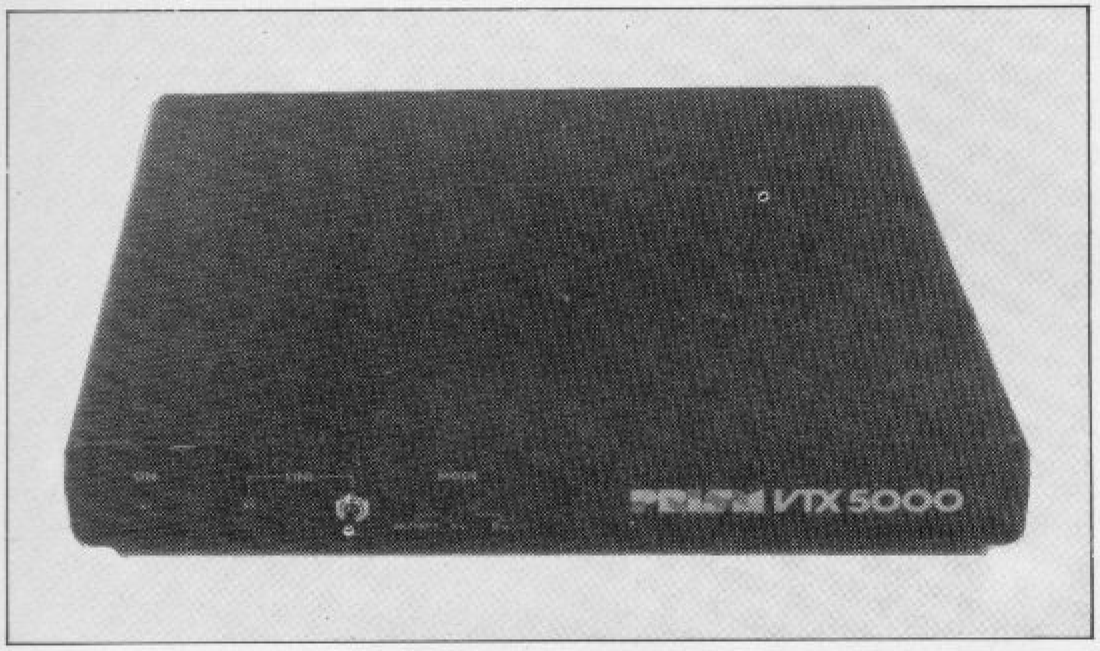
The control of the telephone line is then with the Spectrum. You are then ready to use Micronet 800, from whose page you start, or other open Prestel facilities. Micronet and other closed databases are restricted to members who pay a subscription to join. In the case of Micronet it is £52 per year.

Micronet 800 provides facilities for exchanging messages with other users, including the Information Providers; ordering goods; downloading free programs; or buying programs which are downloaded to you over the telephone. There are also various news and information pages on BBC and Spectrum machines.

The present database of free programs seems to be made up of programs seen in *Sinclair User* and the amount of programs for sale is limited. There are two 16K programs and about 10 48K programs and none of the famous names is among them either.

None of the major software houses for Spectrum software seem to want to use Prestel to sell their programs but that may change as more users log-on from Spectrums.

The Prestel page is 40 columns by 24 lines and so the character set has been altered to give the smaller characters



required, as well as re-defining the graphics characters. Various features also allow you to specify colours and use FLASH or REVEAL functions.

The page number is always printed at the top with the price of the page and what kind of page it is — in this case Micronet 800. At the bottom of the page is anything you type-in at the keyboard.

Only numbers, the two SHIFT keys, and ENTER are recognised. To get out of any frame press CAPS SHIFT and ENTER, which will return you to the main menu, from which you can get back to Basic by pressing 7.

Any of the frames can be copied to the Sinclair printer, stored in RAM or on tape. The screens are stored as a single DIMensioned variable B$(600) and are SAVEd and LOADed as DATA. The terminal software uses normal 32-character Spectrum screens for the menus.

The frames for programs have the first two pages as an introduction and from page number c onwards they consist of the data stored in CET format at about 850 bytes per frame. Micronet always starts loading from page c until the last page unless it is told by the user from the downloading menu.

When LOGging OFF Prestel, a response page is printed if there are any messages in the mailbox for you. You then have a choice of reading them, erasing them or storing them on tape like any other page.

Using Prestel can become very boring, as the only facilities you have are the numbers 0-9, the SYMBOL SHIFT key — used as * — and the ENTER key — used as #. To work your way through to a particular page you can either go direct to the page, if you know it, by * Page number #, or by using one key to select from a menu the next descending menu, until you reach the page you want.

All the time you are doing that you will be charged for the price of a local telephone call. If you intend to use Prestel a good deal it is worth storing some of the index pages on tape via the Save Frame facility, as they can allow you to pick up the correct page immediately.

As the control program is written in Basic it would not be too difficult to alter it to do a search of Prestel for the information you want, or to call a certain page automatically.

That would certainly speed the access to the information and save money on telephone bills. That kind of program would have to be SAVEd on tape, as the original program would be installed on switch-on.

You do not have to be connected to Prestel to view pages stored on tape and the terminal software allows you to leave Prestel and do something on the computer and then return to it where you left off. That will happen also when you download software as it over-writes the Basic program.

To return to Prestel you type RAND USER and then a number, which depends on whether you own a 16K or 48K Spectrum. The only way to leave Prestel is to LOG OFF on the main menu or by changing the LINE switch. For this a computer can be connected between 8am and 6pm from Monday to Friday and between 8am and 1pm on Saturday. An additional fivepence a minute will be added to the normal local telephone charge. More details can be found on page 123 on Prestel or by telephoning Freephone 2043.

The instructions with the package are simple and easy to understand, with plenty of pages reproduced by a Sinclair printer. The only facility not mentioned is the two terminal facilities, TX and RX. TX allows you to send data and programs at 1,200 baud to another user using a 1,200 baud modem. Any data sent is also echoed to the Spectrum for printing on the screen, which is a useful way of checking it is working. You can transmit only in this mode and cannot see anything sent to you.

The RX mode is the same as the TX mode, except that any characters typed-in are not echoed, but are lost. So to talk to another user you must move the switch constantly from TX to RX and back again. There is a software switch for it but at the moment there is no software to run it.

Micronet 800 and the Prism VTX 5000 modem allow you access to the database, at a price. The cost of the modem is £74.95 plus £13.15 per quarter plus VAT.

For that you get access to Prestel and Micronet 800; a free jack socket is fitted within 72 hours by British Telecom where your telephone was sited. Also the telephone has a new cord to allow it to plug into the socket.

Those charges are made quarterly, so it would be better to keep a note of how much time you spend and when, as you go along, so you do not receive a massive bill.

The usefulness of having all this information on tap 24 hours a day, seven days a week, will depend on how much it costs to get it and what is available. On Micronet the information side is just getting started for the Spectrum and the cost is high.

Prestel has more information in it, as it has been operating longer, and information on airlines, railways, pubs, clubs, theatres in any area of the country could be very useful if you want to make a reservation.

The more people who use the system, of course, the better the system becomes and possibly the cheaper it becomes.

The VTX modem provides the key to the door and I had no problems using it which were attributable to the modem. It is for users of the system to explore this new world like an adventure game, publishing the interesting pieces — and the annoying ones — for everyone else to see.

Using the mailbox facility, messages could arrive by Micronet and not by post in the near future, taking seconds instead of days. It could also solve the commuting problem by you doing your work from home via a Prestel terminal.

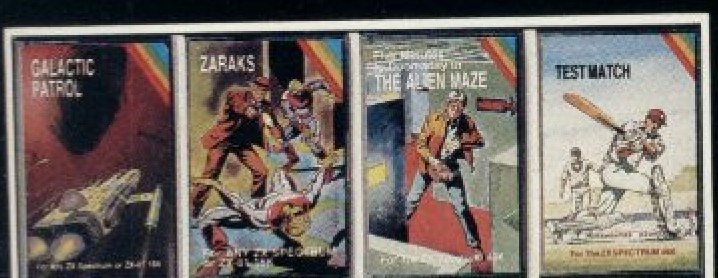
Micronet 800 is at Scriptor Court, 155 Farringdon Road, London EC1R 3AD. Tel: 01-278 3143.



SHARP

The dream sellers





CRL brings a whole new world of excitement right into your living room!

Games that test your skills to the ultimate – whether it's zapping down invaders or playing a whole game of cricket.

Only CRL offers such a wide choice of computer programs for the world's most popular micros.

... catch one today at Boots, Laskys, Menzies, selected branches of W. H. Smiths, Spectrum Group and all good computer shops or send direct to CRL.

Never has so much excitement been contained in a cassette!

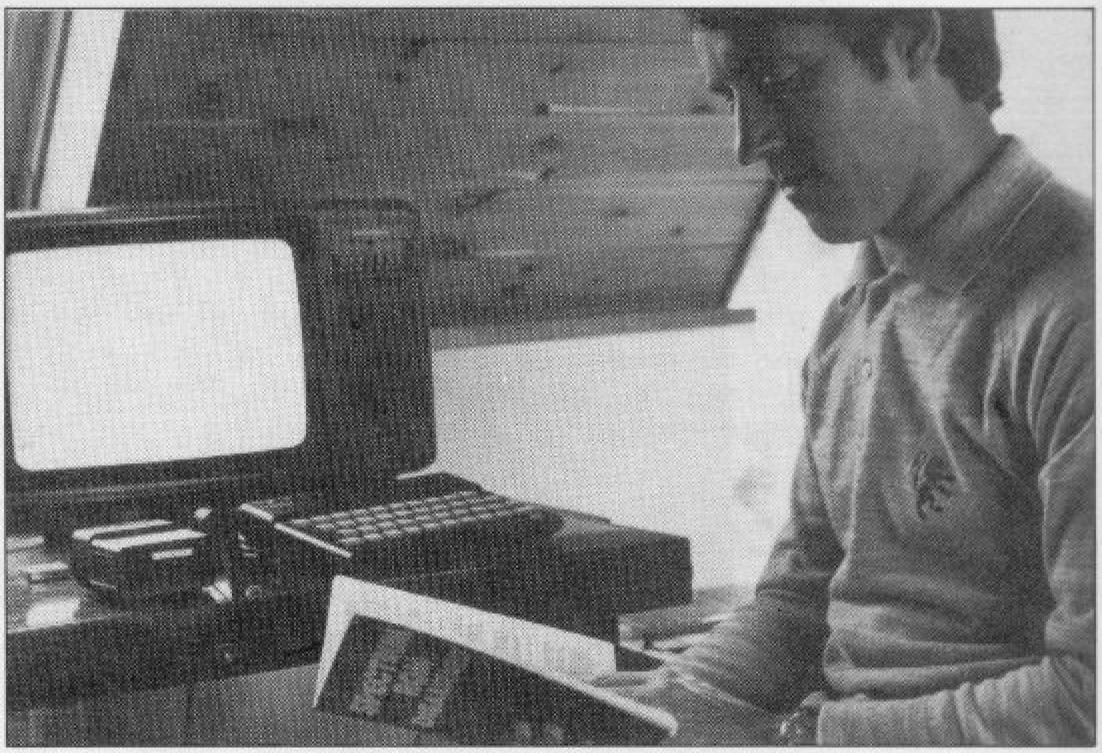
CRL

140 Whitechapel Road London E1

Microdrives are still being developed

John Gilbert talks to Ian Logan, the man who wrote the software for the ROM in the new Sinclair storage device

DR IAN LOGAN leads a quiet life, despite having written several popular books about computers and having just completed work on the Microdrive ROM. There are few journalists pounding at his door and he prefers it that way. He has a country practice in and around Lincoln. He lives at Skellingthorpe on the outskirts of Lincoln, with his wife and children. Apart from the odd journey to the Cambridge offices of Sinclair Research or to London to take part in a Microfair, he handles most of his business by post or on the telephone.



Logan's Spectrums are in the bedroom. He has two of them set up with a dot-matrix printer. Surprisingly that collection occupies only a quarter of the room; the rest of it is not cluttered with the debris of an interest in computers.

The two Spectrums are sufficient to run all the facilities of Interface One and Microdrives, of which he has two. He explains the development and use of the new Sinclair peripherals with the ease of a schoolteacher who has spent several years lecturing on a subject.

"I first started to work for Sinclair last December. I went to Cambridge and Nigel Searle asked me if I would like to do some work and I could write a book about it.

"At that time the Microdrive did not exist. It was developed in a large crate with the ULA at the centre. There is very little to the insides of the Microdrive. There is one ULA and the dual heads which read the tape. The Microdrive program was developed on EPROM. If there were corrections to the program I would go to Cambridge with the alterations and we would blow a new EPROM.

"In the end, Martin Brennan, who was in charge of the project, said 'Right, that's the end'. I have no doubt that he had added two extra things by the next morning."

Logan wrote the software for the Microdrive ROM only. It was Brennan who was responsible for the design for the network and he wrote most of the software which drove it as well.

In the early stages Brennan was known as the man who could get everything. He was the one who talked to those above and below. Logan says:

"His importance to the project was shown when you entered the office at Cambridge. One of the places which was off limits was the television laboratory. There were signs saying that it was a restricted area and no-one must enter. When you wanted to see Brennan there were no signs in his part of the office but you had to pass the paper shredder to reach him."

The Microdrive controller program has not been put on to ROM, even though at least 1,000 have been sent to customers. Logan says:

"One reason the Microdrive still contains an EPROM is that Sinclair Research wants to re-design the circuit board at some stage. When you can get a Microdrive with a nicely-covered ULA and tidily-set-out board you will know that Sinclair is finally convinced that everything is right."

At the moment there are still two definite bugs in the ROM of the device, which Logan hopes will be cleared quickly before the Microdrive control program is put into ROM. One of the problems which occurs is that the Spectrum does not select the screen automatically when it returns from working with the Microdrive.

> 'At the moment there are still two definite bytes in the ROM of the device, which Logan hopes will be cleared quickly before the control program is put into the ROM'

Logan thought of a simple answer to that during the interview. While he was demonstrating the network he found that by selecting the screen every time the computer discontinued work with the Microdrive, the problem would be eliminated.

Logan gives a very interesting description of how the interface devices

work. He says: "I like talking to people as, when you are explaining things, you develop new phrases and ways of putting things over."

He described the network as a fantastic piece of work, especially where the software for its operation is concerned. It will enable two Spectrums to be connected so that, for instance, two people on separate Spectrums can play the same game and influence each other's rate of play. He says:

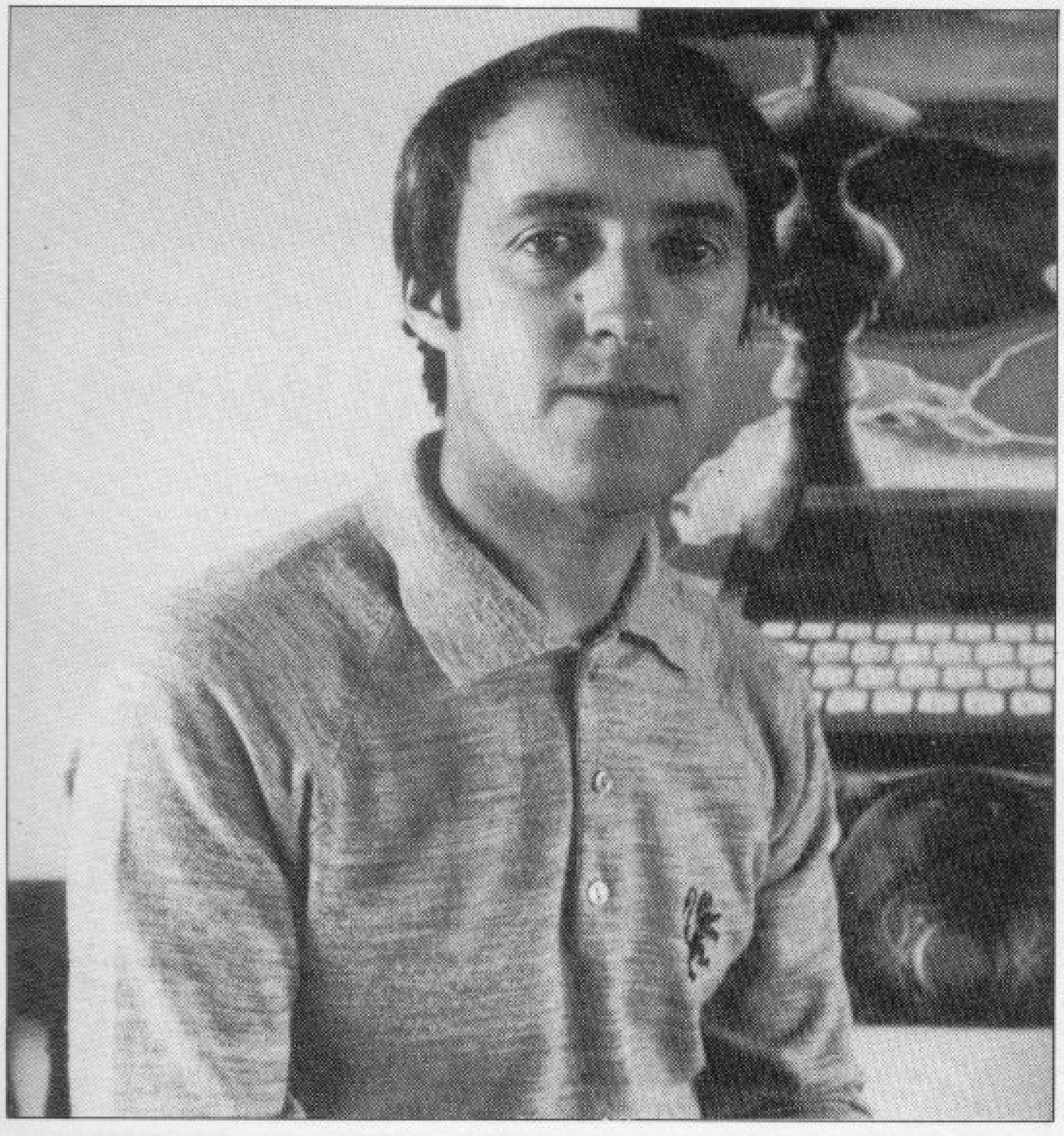
"I think there is a great potential for two-player, interactive games. With the network you will be able to have two people playing a game. Each player will be influenced by the other's actions. You could imagine what it would be like to have something like The Hobbit using the network. You would not only have the computer continuing to perform actions even though the players are not doing anything — the players would also be able to affect what each other found in locations. I would be interested to see what a software house makes of the possibilities."

The RS-232 interface provided another interesting demonstration. Logan explained that it could be used to connect two Spectrums but it would also allow you to put any other piece of equipment on to the Spectrum. He says:

"The possibilities are endless. For instance, you could connect a BBC micro to a Spectrum using the interface. The Spectrum could then be told to wait for a signal and anything which you type on to the BBC keyboard could be printed on to a Sinclair printer attached to the Spectrum. Unfortunately you cannot tell one computer to inform another that you want to talk to it. You have to set the other computer to listen for any signals."

Logan's enthusiasm for the subject shows that he is still learning about the Interface and Microdrive. It seems that even though you help in the development of a device you can still discover new areas to look into weeks after you have finished the project. For instance, it is possible to speed the access time of the Microdrive to some extent if you have two parts to a program which are loaded separately. You may have a screen to load and then the main program. By writing a program to store the first screen, performing one or two CATs and finally saving the second part, the two programs will be loaded in a good position on the tape and will load back reasonably quickly.

If you do not do that the tape loop will go round one extra time and the two parts of the program will be in difficult positions when you need to find them again.



Many of those tips are in a yet-to-be-published book by Logan, *The Microdrive Book*. It delves into the workings of the Microdrive and how the Interface is used with it. Looking at the proofs there are plenty of illustrations of how programs and data are stored on tape and how to transmit data over the RS-232.

Also included is another aspect of the

'Logan is still learning about the Interface and Microdrive'

Interface which enables a user to patch, or add, extra Basic commands to the Basic interpreter. It means that you can write machine code extensions to the language and Logan has been busy doing so already.

"You can re-define the original keywords to do different things but you cannot define your own keywords," he says.

Logan has created several new commands. One of them will allow the user to change the colours on the screen without using the CLS command to clear the screen and re-set the colours. Previously that meant clearing the screen, re-displaying anything which was on it and re-setting the new colours. With Logan's new command the machine does all that for you.

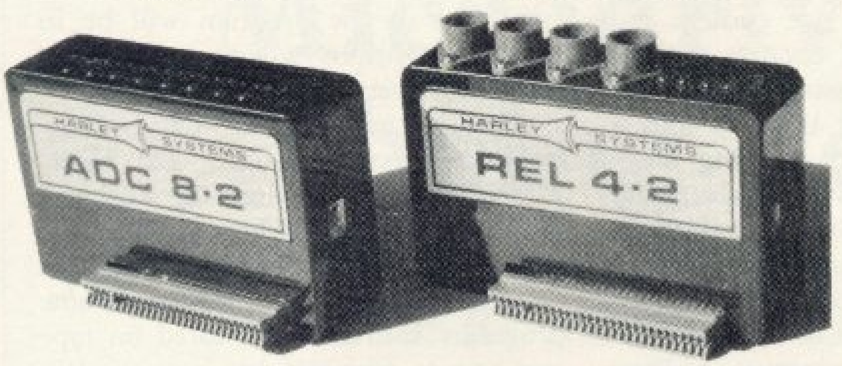
The book is due to be released soon and will be published by Melbourne House. It is likely to be the definitive and perhaps the only work on the Microdrive.

The Microdrive and all the work which he put into it may be behind Logan now. He says that Sinclair Research talks about it and the Spectrum in the past tense and that it arises only occasionally in conversation between the company's staff.

They have moved on to new and different projects, of which they talk only in whispers, but Logan is only just beginning to appreciate the potential of his Microdrive. Like the Spectrum ROM and all of the ZX-81 before it, he will be the one who tells the user what the Microdrive is capable of doing.

HARLEY SYSTEMS

ANALOGUE INPUT — **RELAY SWITCHING**



INTERFACES FOR SPECTRUM

Tough, durable cases for long life. No bare boards. Switched addressing for compatibility with all other peripherals. Daisy chain further modules or any other device. No mother board or cable required. Great economy. Compact.

ADC 8 · 2 £52
ANALOGUE INPUT MODULE

Monitor light, temp, strain etc. Capture data from instruments. Analyse and record signals. 8 channels. 8 indicating LEDs. Simple term' block connections. Inputs from 0 to + 10 mV up to 0 to + 5.12V. Sensitivity chosen by resistors. Up to 40,000 rdgs per sec. Use Basic or MC code.

REL 4 · 2 £58
RELAY SWITCHING MODULE

Switch Lights, motors, heaters chillers, solenoids, Hi Fi etc. Control machines, processes, light shows, instruments etc. High power handling. 4 channels each with warning LED. Up to 12 switchings/sec. Switch up to 5A @ up to 240 VAC. Safe insulated sockets.

Postage £1 · 00. All prices include VAT @ 15.
Cheques/PO's payable to ....

Send SAE for more details.

HARLEY SYSTEMS LTD,
BOX 3, THE PEPPERBOXES,
GT. MISSENDEN,
BUCKS,
HP16 9PR.



New action sports games feature a 3D view of the game. In football and tennis you play one side, the computer plays the other. The computer is fast and hard to beat. Different skill levels.

FOOTBALL
Each player can move, shoot etc. independently. Includes fouls if players collide, corners, throw-ins etc. Scale 90 minutes play. Any team of names can be used. Game can be suspended and player numbers shown at the press of a key. **Price £5.50.**

BIG MATCH SOCCER
Just like football game but for 2 players. Each player uses keys at his side of the keyboard to control his men. All men can be moved, shoot etc. independently. Practice with football then play your friends in the big match. **Price £5.50.**

SUPER SOCCER
A deluxe version of the football. Even faster action, harder to beat. Choose team colours etc. **Price £7.00.**

TENNIS
Each key plays a different stroke. Move your players anywhere on court. Computer plays a hard game. All tennis rules used, just like the real thing. Proper serving and scoring. Plays 3 sets. Animated figures. **PRICE £5.50.**

TANK BATTLE
3D view from the tanks' turret of woods, villages, attacking tanks etc. Shots can destroy buildings, trees and enemy tanks. 360 degree turret movement. **Price £4.50.**

CAR RACE
You drive one car, the computer the other. Control your car with steering and brakes. Choice of 2 circuits. Lap counters and time recorded. **Price £3.95.**

Buy any 3 games, get any game free
Please add 35p post and packing per order

Winters Ltd, Dept SU, 24 Swannington Close, Cantley, Doncaster, S Yorkshire, DN4 6UA

MAKES FUN OUT OF LEARNING

COMPUTERTUTOR

NEW! For ZX Spectrum 48K

Computertutor can give your child a head start with games that really make fun out of learning

Children of today are fascinated by computers. With micros already used in schools throughout the country their involvement in education and in our daily lives is increasing all the time.

To give young children a head start we've created, with parents, teachers and, of course, children, the Clever Clogs series, designed to appeal to children in the 3-7+ year old age group. Help them develop basic skills, stimulate imagination and increase their self-confidence. Unlike similar products, each Clever Clogs program offers a wider choice of games to play. And each game can be made more 'difficult' by simple editing of the tape and resetting new questions. In this way you can keep up with your child's progress - even link the questions into work they're doing at school.

The Clever Clogs series can be used by your whizzkid on their own with initial help from you.

Price of each program £6.50 (incl Vat, P & P). Overseas orders £1 extra per tape for airmail delivery.



SPECIAL LAUNCH OFFER Buy 3 games – get one C20 blank tape FREE!

PARTY TIME for Age 3 yrs +

With parent's help even tiny tots will love to play these party games. They can 'blow out' the candles on a cake, sing along with nursery rhymes, even draw on the screen. If you have a printer you can record your Clever Clogs artistic efforts and watch their progress as they develop new skills. Because each Clever Clogs program offers a choice of games to play and has the facility to increase the 'difficulty' factor your children won't grow out of them so quickly.

JUNGLE JUMBLE for Age 5 yrs +

At this age less parental help and guidance are necessary. Your child will continually be seeking new experiences and will enjoy his/her mind being challenged. Clever Clogs satisfies both criteria.

Correct answers to questions build up a picture of an animal - is it a real one? That's up to the player. Take your choice and create your own unique zoo and you can record them on your printer if you have one. By getting correct answers to several questions you can enter the great Safari Park chase . . . the possibilities are endless!

***WHIZZ QUIZ for Age 7 yrs +**

A game of skill and chance for 1-4 players that will get your whizzkids thinking hard. But Clever Clogs of this age like a challenge. You can proceed from the general knowledge questions already programmed and you can enter up to 250 questions of your own - there's tremendous scope here for the really clever, Clever Clogs! Watch them develop their three "R's" and in a way that will fascinate you as much as them.

Trade enquiries invited.

*Also for ZX Spectrum 81 (16K)

Please send me:

______ copies of PARTY TIME (3 yrs +) at £6.50 per tape
______ copies of JUNGLE JUMBLE (5 yrs +) at £6.50 per tape
______ copies of *WHIZZ QUIZ (7 yrs +) at £6.50 per tape
*Also for ZX Spectrum 81 (16K)

Computertutor, P.O. Box 3, St. Neots, Huntingdon, Cambs. PE19 3NW Telephone: (0480) 213969

I enclose cheque/PO for £

Name ______

Address ______

Postcode ______

SU 10/83

Please allow 7 days for delivery

MEMOTECH

The Complete Range

NEW PRICES UP TO 37·5% OFF PLUS FREE P+P!

Fifteen months ago Memotech developed the first 64K Memopak, designed to maximise the capabilities of the Sinclair ZX81. Since then, using the ZX81 as a starting point, we've gone on to produce a comprehensive range of Memopaks, adding 16K and 32K memory expansions, utilities packages comprising a Word Processor, Z80 Assembler and Spreadsheet Analysis, plus Communication Interfaces, High Resolution Graphics and a professional quality Keyboard.

To complete our range of ZX81 add-ons, we are now introducing the MEMOPAK RS232 Serial Interface.

RS232 Interface

The RS232 is an all-purpose interface which allows the ZX81 not only to output to suitable serial printers, but can link up with numerous types of peripheral or even other processors. The Interface has two main modes of operation: BASIC mode allows you to use the range of functions supplied in the RS232 EPROM within an ordinary BASIC program, and TERMINAL mode allows you to use your ZX81 as a terminal to another processor. The EPROM functions offered permit the user to send, receive and convert bytes between ZX81 code and ASCII, as well as check the status of numerous control flags. Received or transmitted data can appear simultaneously on the screen, and received data may be printed simultaneously.

£39.95 inc. VAT

Memopak Centronics I/F

The BASIC commands LPRINT, LLIST and COPY are used to print or any CENTRONICS type printer. All ASCII characters are generated and translation takes place automatically within the pack. Reverse capitals give lower case. Additional facilities allow high resolution printing.

£24.95 inc. VAT

Memopak HRG

This pack breaks down the constraints imposed by operating at the ZX81 character level and allows high definition displays to be generated. All 248 × 192 individual pixels can be controlled using simple commands, and the built in software enables the user to work interactively at the dot, line, character, block and page levels.

£29.95 inc. VAT

Memocalc

The screen display behaves as a 'window' on a large sheet of paper on which a table of numbers is laid out. The maximum size of the table is determined by the memory capacity, and with a Memopak 64K a table of up to 7000 numbers with up to 250 rows or 99 columns can be specified.

£29.90 inc. VAT

Memotext

Text is first arranged in 32 character lines for the screen with comprehensive editing facilities. On output the user simply chooses the line length required for printing and the system does the rest. Used with the Memopak Centronics Interface, the Word Processor makes available printout with 80 character lines, upper and lower case and single and double size characters.

£29.90 inc. VAT

Memopak Memory Extensions

For those just setting out on the road to real computing, these packs transform the ZX81 from a toy to a powerful computer. Data storage, extended programming and complex displays all become feasible. Further details available on request.

16K Memopak £24.95 32K Memopak £34.95
64K Memopak £49.95 Prices inclusive of VAT

MEMOPAKS ARE AVAILABLE AT MAIN BRANCHES OF WH SMITH and JOHN MENZIES



Z80 Assembler

The Assembler allows you first to code and edit a source program in the Z80 language, and then assemble it into machine code. You can now write flexible and economic programs. The Editor mode allows you to code directly in the right format, manipulate individual lines and control the exact placing of source and machine code. Routines may be merged or listed (even to a commercial printer using our Centronics Interface). The assembler mode handles all standard Z80 mnemonics, numbers in hex or decimal, comments and user-selected labels.

£29.90 inc. VAT

Memotech Keyboard

The Memotech plug-in Keyboard plus buffer pack takes the effort out of data entry for ZX81 users. The Keyboard has a light professional touch and is housed in an elegant aluminium case. The simple plug-in system means that you are not obliged to open up your ZX81, use a soldering iron or invalidate your ZX81 warranty.

Keyboard Buffer Pak

The Buffer Pak performs a "housekeeping" function for the Keyboard, interfacing directly with the port of your ZX81.

£34.95 inc. VAT

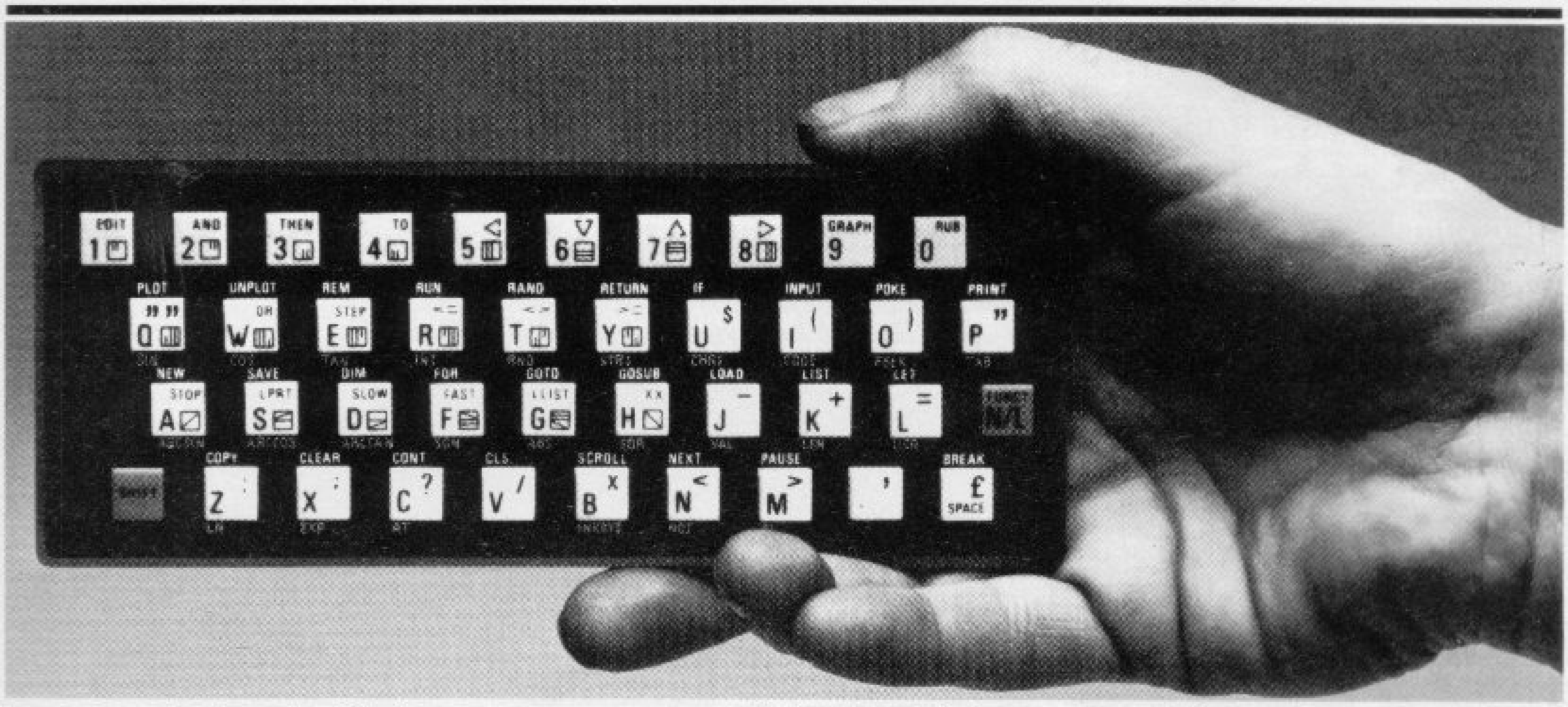


All Prices are inclusive of VAT, postage and packing.

To Order: Send your Name, Address, Memopaks required, plus a Cheque/Postal Order/Access/Barclaycard number (please state which) to: Memotech Limited, Station Lane Industrial Estate, Witney, Oxon. OX8 6BX. Telephone Witney 2977

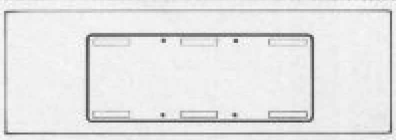
We want you to be completely satisfied with your Memopak – all our products carry a 14 day money back guarantee.

NOW. A ZX81 PUSH-BUTTON KEYBOARD FOR UNDER £10.

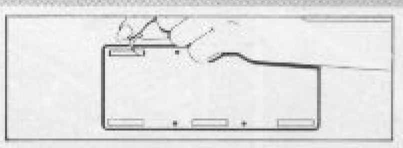




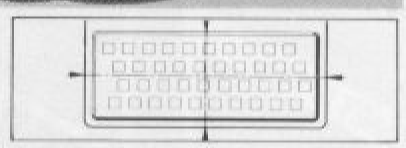
1. Make sure the original keyboard is clean and check that all the keys function.



2. The Buttonset is held in place by self adhesive pads.



3. So all you do is remove the protective backing.



4. And place it centrally on your ZX81.

At last there's a really cheap but efficient way of ironing out the ZX81's only real bug: its keyboard. The Filesixty Buttonset offers:

■ A full-travel calculator-type moving keyboard for only £9.95. ■ Installed in seconds. The peel-off adhesive backing means you just register into position and press. ■ No messy labels, dismantling or soldering. ■ 3 groups of colour keys to pick out shift, numerals and newline. ■ Precision moulded in ABS to match your ZX81, with contrasting legends for maximum legibility.

Filesixty Ltd., 25 Chippenham Mews, London W9 2AN, England.
Tel: 01-289 3059. Telex: 268 048 EXTLDN G 4087.

Orders to Filesixty Ltd., FREEPOST, London W9 2BR.

Cheques/PO made payable to Filesixty Ltd.

Please send me __________ (qty) Buttonset(s) at £9.95 each (including VAT and P&P).

Total £ __________ BLOCK CAPITALS

Name __________

Address __________

SU11/83

FILESIXTY

PROGRAM PRINTOUT

Instructions for graphics characters are printed in lower-case letters in our listings. They are enclosed by brackets and separated by colons to distinguish them and the brackets and colons should not be entered.

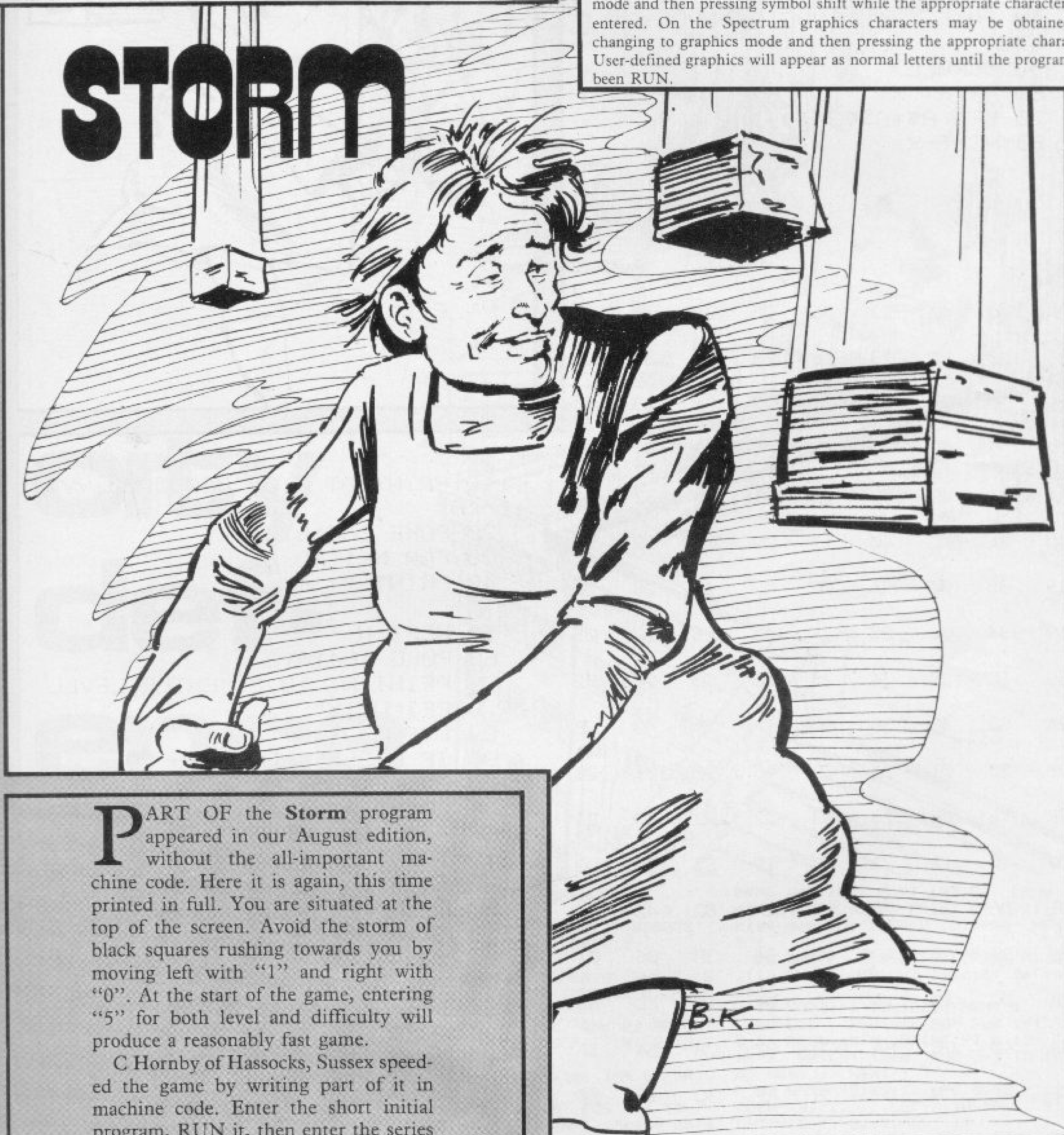
Inverse characters are represented by the letter "i" and graphics characters by "g". Thus an inverse W would be represented by "iw", a graphics W by "gw", and an inverse graphics W by "igw".

Spaces are represented by "sp" and inverse spaces by "isp". Whenever any character is to be used more than once, the number of times it is to be used is shown before it, together with a multiplication sign. Thus "6*isp" means six inverse spaces and "(g4:4*i4:g3) would be entered as a grapic four, followed by an inverse four repeated four times, followed by a graphics three.

Where whole words are to be written in inverse letters they appear in the listings as lower-case letters. Letters to be entered in graphics mode on the Spectrum are underlined.

Inverse characters may be entered on the ZX-81 by changing to graphics mode and then typing the appropriate characters and on the Spectrum by changing to inverse video and typing the appropriate letters. Graphics characters may be entered on the ZX-81 by changing to graphics mode and then pressing symbol shift while the appropriate characters are entered. On the Spectrum graphics characters may be obtained by changing to graphics mode and then pressing the appropriate character. User-defined graphics will appear as normal letters until the program has been RUN.

STORM



PART OF the **Storm** program appeared in our August edition, without the all-important machine code. Here it is again, this time printed in full. You are situated at the top of the screen. Avoid the storm of black squares rushing towards you by moving left with "1" and right with "0". At the start of the game, entering "5" for both level and difficulty will produce a reasonably fast game.

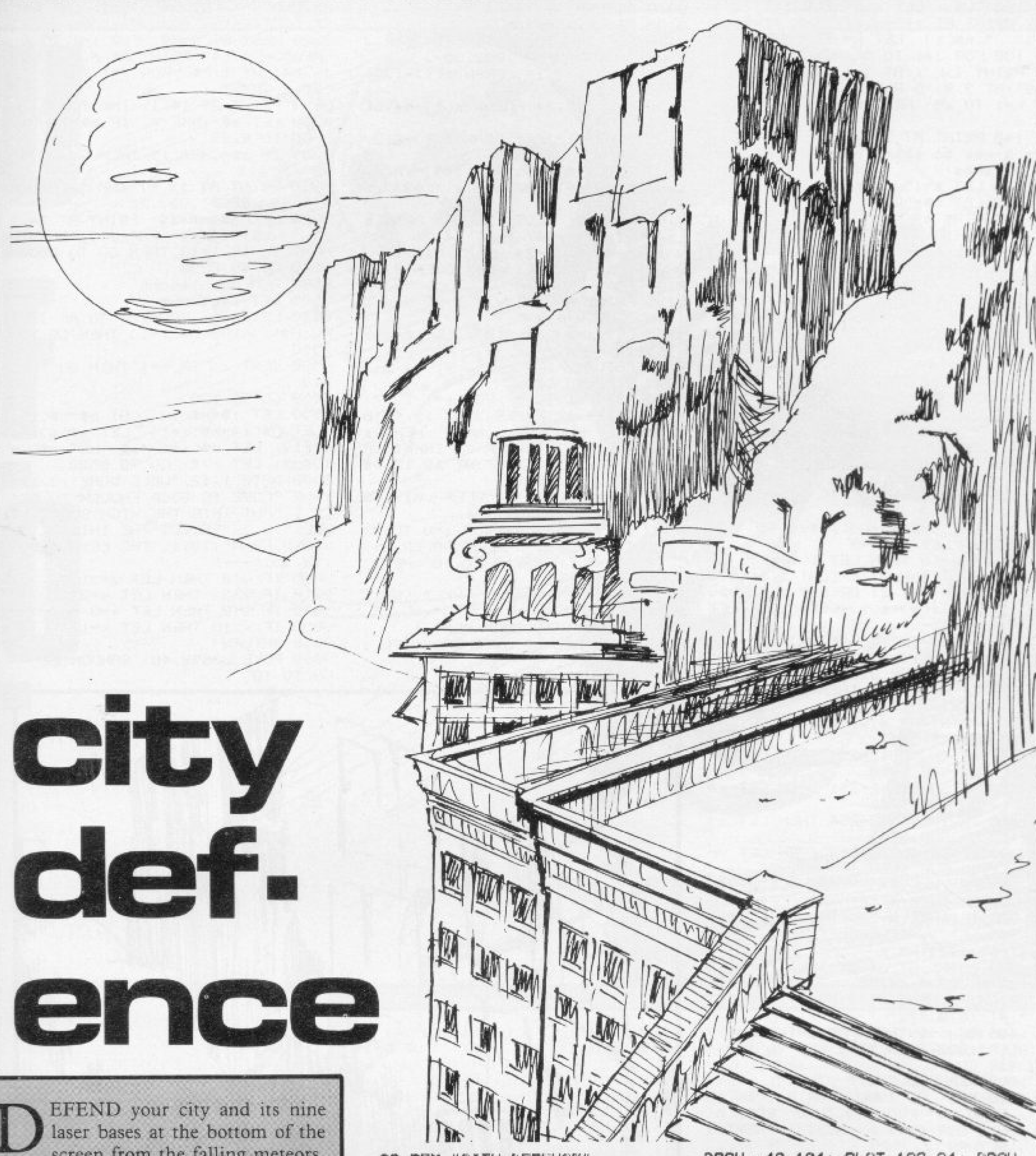
C Hornby of Hassocks, Sussex speeded the game by writing part of it in machine code. Enter the short initial program, RUN it, then enter the series of numbers two at a time, entering "S" to end the series. RUN the program again, delete all lines except line one, and then enter the main program (16K ZX-81).

```
   1 REM 000000000000000000000000
00000000000000000000000000000000
00000000000000000000000000000000
0000000000(THIS IS UNE HUNDRED A
ND EIGHTY EIGHT CHARACTERS IN AL
L)000000000000000000000000000000
00000
  10 LET A$=""
  20 FOR X=16520 TO 16701
  30 IF A$="" THEN INPUT A$
  40 POKE X,16*CODE A$+CODE A$(2
)-476
  50 SCROLL
  60 PRINT X,"    ";A$( TO 2)
  70 LET A$=A$(3 TO )
  80~NEXT X
```



2A	ØC	4Ø	23	Ø6	Ø8	36	1C	23
Ø5	2Ø	FA	23	Ø6	Ø3	36	3B,	23
Ø5	2Ø	FA	2A	ØC	4Ø	11	23	ØØ
19	22	82	4Ø	3E	Ø4	32	84	4Ø
3A	84	4Ø	3D	2Ø	Ø1	C9	32	84
4Ø	2A	ØC	4Ø	11	Ø9	ØØ	19	5F
19	36	ØØ	2A	ØC	4Ø	11	Ø8	ØØ
19	34	Ø6	Ø8	7E	FE	26	2Ø	Ø5
36	1C	2B	34	23	2B	Ø5	2Ø	F2
2A	82	4Ø	36	ØØ	3A	25	4Ø	CB
5F	2Ø	Ø1	2A	CB	67	2Ø	Ø1	23
3E	76	BE	28	Ø3	22	82	4Ø	2A
ØC	4Ø	11	21	ØØ	19	E5	19	D1
Ø1	D6	Ø2	ED	BØ	2A	82	4Ø	3E
8Ø	BE	CA	AC	4Ø	36	3B	Ø6	Ø1
2A	ØC	4Ø	11	D6	Ø2	19	ED	5B
34	4Ø	CB	BA	CB	B2	CB	AA	1A
CB	BF	CB	B7	CB	AF	3C	16	ØØ
5F	19	36	8Ø	Ø5	2Ø	DE	3E	Ø4
Ø6	ØØ	Ø5	2Ø	FD	3D	2Ø	F8	C3
C1	4Ø							

```
  16 PRINT AT 0,0;"00000000 VVV
storm"
  20 POKE 16418,0
  30 FOR N=1 TO 23
  40 PRINT "
              "
  50 NEXT N
  60 POKE 16418,2
  70 PRINT AT 10,3;"ENTER LEVEL
OF DIFFICULTY"
  80 INPUT A
  90 IF A>255 THEN GOTO 80
 100 POKE 16654,A
 105 PRINT AT 10,3;"       ENTER
SPEED        "
 110 INPUT A
 120 IF A>255 THEN GOTO 110
 130 POKE 16690,A
 135 PRINT AT 10,3;"
              "
 136 FOR N=1 TO 50
 137 IF INKEY$<>"" THEN GOTO 140
 138 NEXT N
 140 RAND USR 16520
 150 PRINT AT 10,10;"GAME OVER";
AT 20,9;"PRESS A KEY"
 160 IF INKEY$<>"" THEN GOTO 160
 170 IF INKEY$="" THEN GOTO 170
 180 RUN
 190 SAVE "STORM"
 200 RUN
```



city def-ence

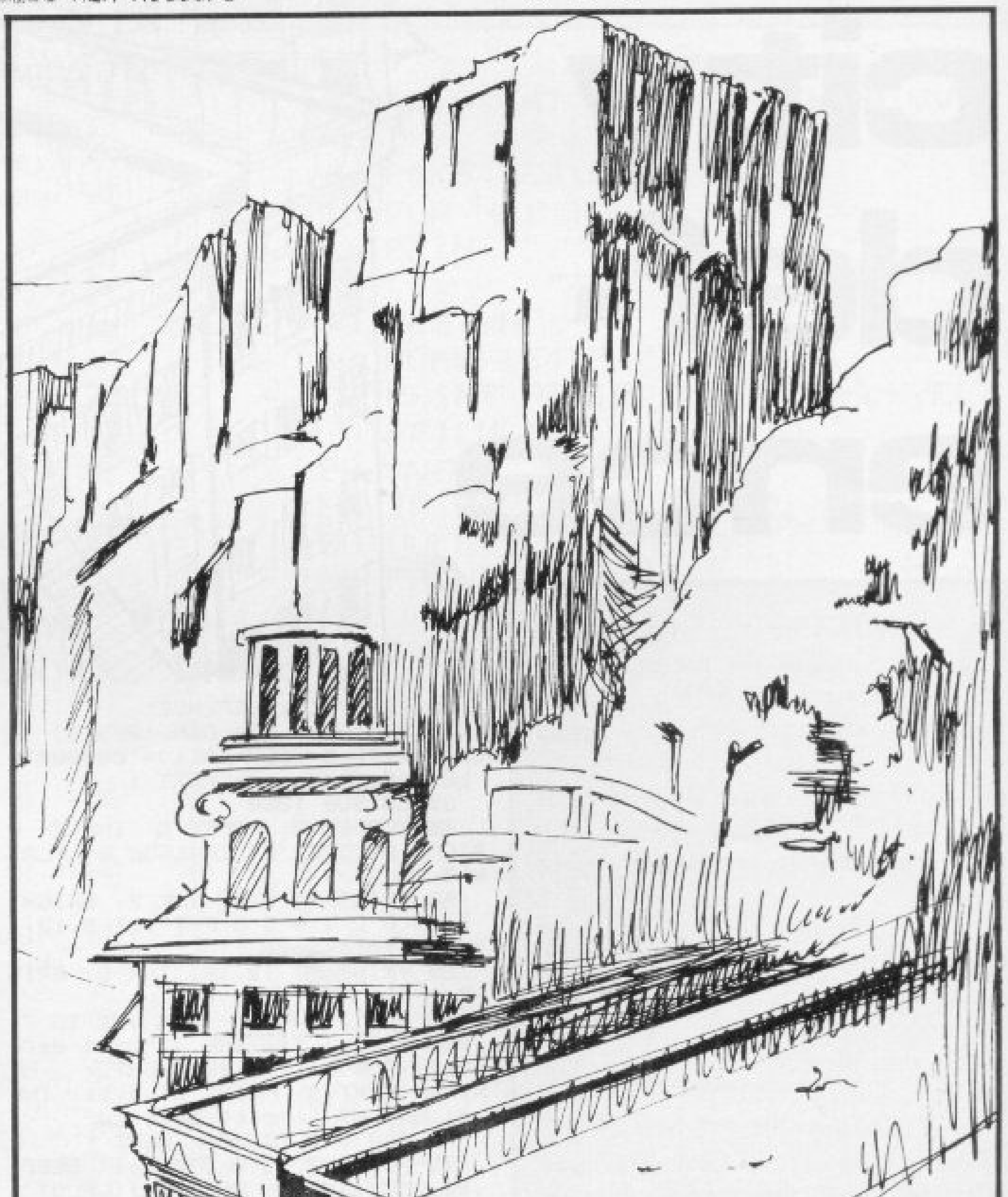
DEFEND your city and its nine laser bases at the bottom of the screen from the falling meteors. If you touch a meteor with your sights your lasers will fire and destroy it. Move up with Q, down with Z, right with P, and left with I. Move diagonally with the appropriate combinations of those keys.

You can also move through the three zones of your airspace very quickly by pressing 1, 2 or 3 as appropriate. The game becomes progressively more difficult and one meteor can destroy your entire city.

Tim Wolverson of Rotherham, South Yorkshire, who wrote **City Defence** for the 16K Spectrum, says his highest score so far is 3,360.

```
  20 REM "CITY DEFENCE"
  30 DIM h$(5,6): DIM n$(5,3): F
OR i=1 TO 5: LET h$(i)="000000":
 LET n$(i)="---": NEXT i
  35 GO SUB 1000
  40 BORDER 0: PAPER 0: INK 7: B
RIGHT 0: OVER 0: INVERSE 0: FLAS
H 0: CLS
  50 PRINT AT 1,8; INK 2; BRIGHT
 1;"W O L V O S O F T";AT 3,13;
INK 3;"Presents"
  55 PRINT AT 19,16; INK 6; BRIG
HT 1;"b"
  60 FOR i=1 TO 5: FOR j=1 TO 7:
 PRINT AT 5,11; INK j;"city defe
nce": FOR k=1 TO 20: NEXT k: NE
XT j: NEXT i: PRINT AT 5,11; INK
 4; BRIGHT 1;"city defence"
  70 FOR i=1 TO 500: NEXT i
  71 FOR i=7 TO 0 STEP -1: BEEP
.01,-10: INK i: BRIGHT 1: PLOT 1
32,24: DRAW 1,104: PLOT 132,24:
DRAW -40,104: PLOT 132,24: DRAW
40,104: PAUSE 5: PRINT AT 5,11;"
city defence": BEEP .01,-20: NEX
T i
  72 INK 7: BRIGHT 0: PRINT AT 5
,11; INK 2; BRIGHT 1;"city defen
ce"
  73 FOR i=1 TO 1000: NEXT i
  80 CLS : RESTORE 80: FOR i=1 T
O 5: READ c$,x: PRINT AT x,12; I
NK 3; BRIGHT 1;c$: FOR j=1 TO 10
0: NEXT j: NEXT i
  90 DATA "Q.......UP",6,"Z.....
DOWN",8,"I.....LEFT",10,"P....RI
GHT",12,"1-3..ZONEx",14
 100 FOR i=1 TO 5: FOR j=1 TO 7:
 PRINT AT 3,9; INK j;"mission co
ntrols": PAUSE 5: NEXT j: FOR j=
6 TO 2 STEP -1: PRINT AT 3,9; IN
K j;"mission controls": PAUSE 5:
 NEXT j: NEXT i
 110 FOR i=1 TO 500: NEXT i
```

```
 120 CLS : LET x=0: FOR i=1 TO 5
: PRINT AT i+5+x,11; INK 4;h$(i)
;"  ";n$(i): LET x=x+1: NEXT i
 130 FOR j=1 TO 5: FOR i=1 TO 6:
 PRINT INK i;AT 1,11;"T O D A Y'
S";AT 3,9;"G R E A T E S T": FOR
 k=1 TO 25: NEXT k: NEXT i: NEXT
 j
 140 PRINT AT 17,0; INK 5;" Pres
s a key to start,before thetimer
 expires!"
 150 LET t=15
 160 LET t$="00"( TO 2-LEN (STR$
 t))+STR$ t
 170 PRINT AT 18,15; INK 7;t$: P
AUSE 50: LET t=t-1: IF t=-1 THEN
 GO TO 40
 180 IF INKEY$="" THEN GO TO 160
 185 LET s=0: LET v=0
 190 CLS : GO SUB 8000: LET v=v+
1
 200 LET x=11: LET y=16: LET c=1
 210 DIM a(5): DIM b(5): DIM d(5
): DIM l(5): FOR i=1 TO 5: LET b
(i)=175: LET a(i)=INT (RND*250):
 LET d(i)=(INT (RND*3)+1)-2: LET
 l(i)=1: NEXT i
 300 REM Main loop
 310 PRINT AT x,y; INK 6; OVER 1
;"h": BEEP .01,0
 315 FOR i=1 TO 5: IF l(i)=0 THE
N GO TO 340
 317 LET o=a(i)+(d(i)*v): IF o>2
55 THEN LET a(i)=0
 318 IF o<0 THEN LET a(i)=255
 320 PLOT INK 2; BRIGHT 1;a(i),b
(i): DRAW INK 2; BRIGHT 1;d(i)*v
,-v: LET a(i)=a(i)+(v*d(i)): LET
 b(i)=b(i)-v
 335 IF 21-INT ((b(i)/8)+.5)=x A
ND INT ((a(i)/8)+.5)=y THEN LET
 l(i)=0: GO SUB 8100
 337 IF b(i)<=24 THEN GO TO 8200
 340 NEXT i
 345 PRINT AT x,y; INK 2; BRIGHT
 1; OVER 1;"h"
 350 IF IN 57342=254 THEN LET y=
y+1: GO SUB 9000
 360 IF IN 57342=251 THEN LET y=
y-1: GO SUB 9000
 370 IF IN 64510=254 THEN LET x=
x-1: GO SUB 9000
 380 IF IN 65278=253 THEN LET x=
x+1: GO SUB 9000
 385 IF INKEY$="1" THEN LET x=4
 386 IF INKEY$="2" THEN LET x=10
 387 IF INKEY$="3" THEN LET x=17
 390 LET s$="000000"( TO 6-LEN (
STR$ s))+STR$ s
 400 PRINT AT 21,0; INK 1; PAPER
 3;"SCORE ";s$; INK 7; PAPER 0;
BRIGHT 1;AT 5,0;"↑1";AT 11,0;"↑2
";AT 18,0;"↑3"
 405 IF c=6 THEN FOR i=1 TO 30:
BEEP .003,i: NEXT i: GO TO 190
 410 GO TO 300
1000 REM U.D.G.s
1010 RESTORE 1000: FOR j=1 TO 15
: READ c$: FOR i=0 TO 7: READ b:
 POKE USR c$+i,b: NEXT i: NEXT j
: RETURN
1020 DATA "b",24,b,b,60,102,66,0
,b,"c",126,254,192,b,b,b,254,126
,"d",252,254,198,b,b,b,254,252,"
e",254,b,192,248,192,b,254,b
1030 DATA "f",254,b,192,248,192,
b,b,b,"h",24,b,b,255,b,24,b,b,"i
",254,b,16,b,b,b,254,b
1040 DATA "l",192,b,b,b,b,b,254,
b,"m",198,238,254,214,198,b,b,b
1050 DATA "n",198,230,b,214,b,20
6,b,198,"o",124,254,198,b,b,b,25
4,124,"q",198,108,56,16,b,b,b,b,
"r",124,252,198,b,252,248,204,19
8
1060 DATA "s",126,254,192,252,12
6,6,254,252,"t",254,b,16,b,b,b,b
,b
8000 PRINT AT 19,0; PAPER 0; INK
 3; INVERSE 1;"    bbb         bb
b       bbb
8010 RETURN
8100 REM Explosion
8110 FOR j=7 TO 2 STEP -1: INK j
: BRIGHT 1: BEEP .003,30+j
8120 PLOT 132,24: DRAW a(i)-132,
b(i)-24
8130 PLOT 44,24: DRAW a(i)-44,b(
i)-24
8135 PLOT 212,24: DRAW a(i)-212,
b(i)-24
8137 PRINT AT x-1,y;"(i93)";AT x
,y-1;"(3*isP)";AT x+1,y;"(93)"
8140 NEXT j
8150 OVER 1: PLOT 132,24: DRAW a
(i)-132,b(i)-24: PLOT 44,24: DRA
W a(i)-44,b(i)-24: PLOT 212,24:
DRAW a(i)-212,b(i)-24: OVER 0: B
RIGHT 0
8155 PRINT AT x-1,y;" ";AT x,y-1
;" h ";AT x+1,y;" "
8160 LET s=s+(c*v*10): LET c=c+1
8165 INK 7
8170 RETURN
8200 REM End Game
8210 FOR j=1 TO 5: FOR i=1 TO 7:
 PRINT INK i; PAPER 3;AT 19,4;"b
bb         bbb         bbb": NEXT i
: NEXT j: PRINT OVER 1; INK 1; P
APER 3;AT 19,4;"***";AT 19,15;"*
**";AT 19,25;"***"
8220 FOR i=1 TO 10: BEEP .01,-10
: BEEP .01,-20: NEXT i
8230 FOR j=1 TO 5: FOR i=0 TO 7:
 PRINT AT 21,0; INK i; PAPER 3;"
SCORE ";s$: FOR k=0 TO 10: NEXT
k: NEXT i: NEXT j
8235 PRINT AT 11,12; INK 7; BRIG
HT 1;"GAME OVER"
8240 FOR i=1 TO 500: NEXT i
8250 IF s<VAL h$(5) THEN GO TO 1
20
8260 REM HiScore
8270 CLS : LET h$(5)=s$: LET m$=
"": LET l=15
8280 RESTORE 8900: FOR i=1 TO 6:
 READ d,f,c$: PRINT AT d,f; INK
4; BRIGHT 1;c$: FOR j=1 TO 50: N
EXT j: NEXT i
8290 PRINT AT 14,l; INK 7;"^"
8300 LET a$=INKEY$: IF a$="" THE
N GO TO 8290
8305 IF a$=CHR$ 13 THEN GO TO 82
90
8310 PRINT AT 13,l; INK 5; BRIGH
T 1;a$: BEEP .003,20
8320 LET m$=m$+a$: PRINT AT 14,l
;" ": LET l=l+1: FOR i=1 TO 50:
NEXT i: IF l=18 THEN GO TO 8500
8340 GO TO 8290
8500 REM Bubblesort
8505 LET n$(5)=m$
8510 LET k=0: FOR i=1 TO 4: IF V
AL h$(i)<VAL h$(i+1) THEN GO TO
8550
8520 NEXT i: IF k=1 THEN GO TO 8
510
8530 GO TO 120
8550 LET i$=h$(i): LET o$=n$(i):
 LET h$(i)=h$(i+1): LET n$(i)=n$
(i+1): LET h$(i+1)=i$: LET n$(i+
1)=o$: LET k=1: GO TO 8520
8900 DATA 1,12,"WELL DONE",3,1,"
YOUR SCORE IS GOOD ENOUGH TO BE"
,5,1,"PUT INTO THE HIGH SCORE TA
BLE.",8,1,"SELECT THE INITIAL DE
SIRED FROM",10,1,"THE KEYBOARD."
,13,15,"---"
9000 IF y<0 THEN LET y=31
9010 IF y>31 THEN LET y=0
9020 IF x<0 THEN LET x=0
9030 IF x>18 THEN LET x=18
9050 RETURN
9999 POKE 23658,40: RANDOMIZE
GO TO 10
```



U.F.O.



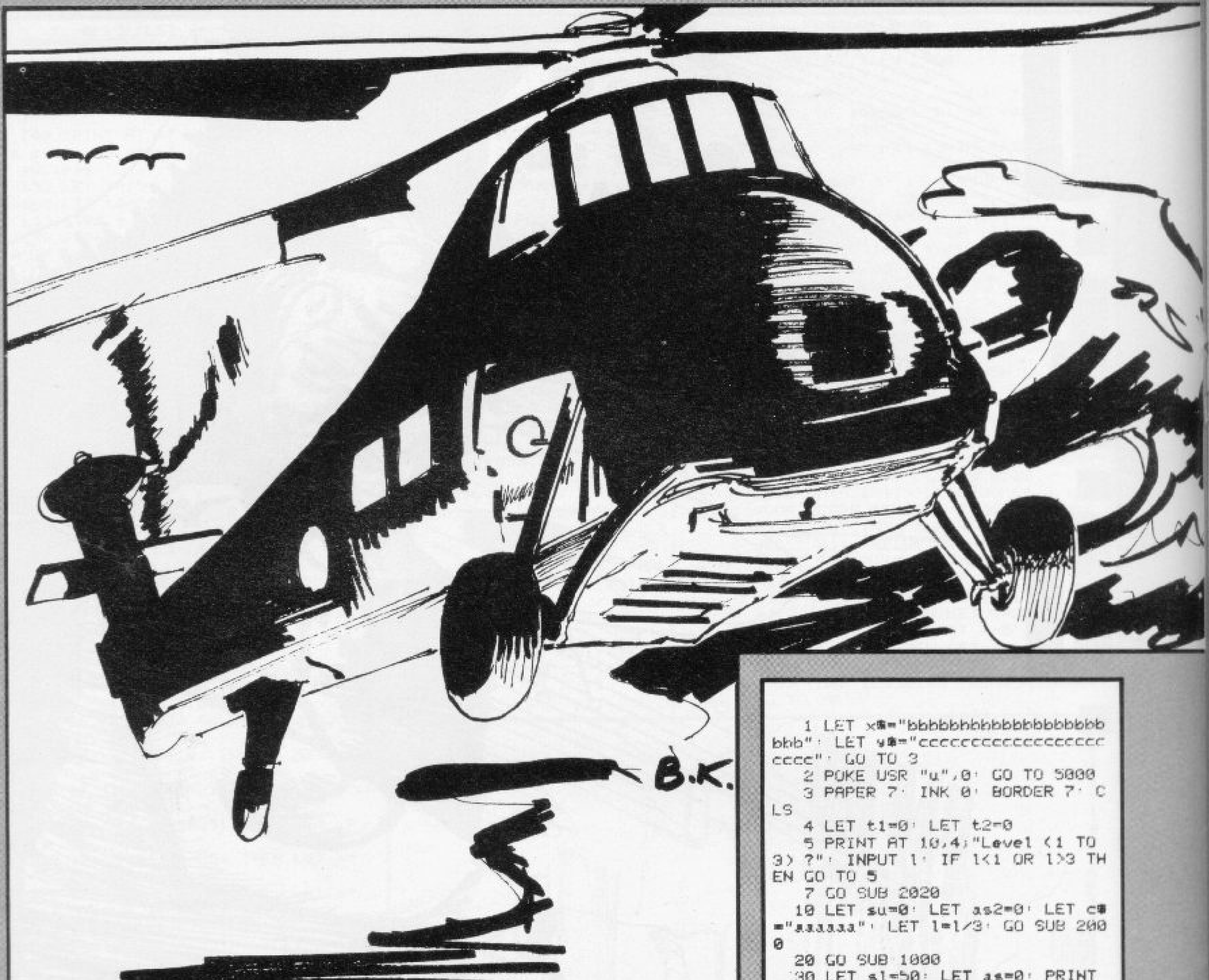
THE UFOs are flying overhead and you must shoot down as many of them as possible by pressing "m". They fly at varying speeds and heights and the further away and the faster they are, the higher your score.

If you miss a shot you will move down the screen, thus making the game more difficult. Once you reach the bottom of the screen the game ends. Whenever a **UFO** escapes you lose a point.

Written for the 16K Spectrum by Kristofer Gamstedt of Erebro, Sweden.

```
  10 FOR n=1 TO 8: READ a$: FOR
f=0 TO 7: READ a: POKE USR a$+f,
a: NEXT f: NEXT n
  20 DATA "a",252,21,63,255,255,
63,31,252,"b",0,255,245,245,245,
241,255,0,"c",0,255,17,117,53,11
3,255,0,"d",0,192,240,254,254,24
8,192,0
  30 DATA "e",0,3,31,127,127,31,
3,0,"f",63,240,252,255,255,252,2
40,63,"g",0,0,0,0,0,255,255,255,
"h",24,24,24,24,255,255,255,255
  40 LET v$="ABCD": LET h$="EBCF
": LET s$="GHG": LET score=0: LE
T y=5: LET p=0
  45 LET l=0
  50 BORDER 0: PAPER 0: INK 7: C
LS
  52 PRINT AT 0,8; PAPER 7; INK
2;" ABCD UFO EBCF ": PRINT AT 21
,12;"SCORE=": GO SUB 300
  55 PRINT AT y,14; INK 7;s$

  56 PRINT AT 21,18;score;"  "
  70 PRINT AT r,k;"    "
  80 IF h=1 AND k>27-ra THEN LET
 score=score-1: GO SUB 300
  90 IF h=2 AND k<ra THEN LET sc
ore=score-1: GO SUB 300
 100 IF h=1 THEN LET k=k+ra
 110 IF h=2 THEN LET k=k-ra
 120 PRINT AT r,k; INK 4;a$
 130 IF p=1 THEN GO SUB 400: GO
TO 150
 140 IF INKEY$="M" OR INKEY$="m"
 THEN LET p=1: LET y1=y-1: BEEP
.1,-10: GO TO 130
 150 GO TO 55
 300 IF RND>.5 THEN LET h=1: LET
 a$=v$: LET k=0: GO TO 315
 305 LET h=2: LET a$=h$: LET k=2
7
 315 LET ra=INT (RND*4)+1
 320 LET r=INT (RND*(y-2))+1: RE
TURN
 400 PRINT AT y1,15;" "
 410 IF ATTR (y1-1,15)<>4 THEN G
O TO 445
 420 PRINT AT r,k;"    "
 430 LET score=score+ra*(y-y1)+5
 BEEP .5,10: GO SUB 300
 440 LET p=0: RETURN
 445 IF y=20 AND y1=1 THEN BEEP
2,-20: GO TO 490
 450 IF y1=1 THEN PRINT AT y,14;
"   ": LET y=y+1: GO TO 440
 460 LET y1=y1-1
 470 PRINT AT y1,15; INK 6;"!"
 480 RETURN
 490 INPUT "Another go?";i$: IF
i$(1)="y" THEN PAUSE 100: GO TO
40
```



AT THE RIGHT of the screen is your small village. At the left of the screen is a vast lake and the dam which protects the village. The dam is under attack and the only way for you to save it is to shoot down the rockets, by pressing SPACE, before they hit the dam.

You must hit at least 30 of the 50 rockets and avoid the dam being breached completely. If you succeed you begin again with a thinner dam. Speeds range from a leisurely "1" to a racing "3".

Dam Buster was written for the 16K Spectrum by Tim and Ringo of Wakefield, West Yorkshire.

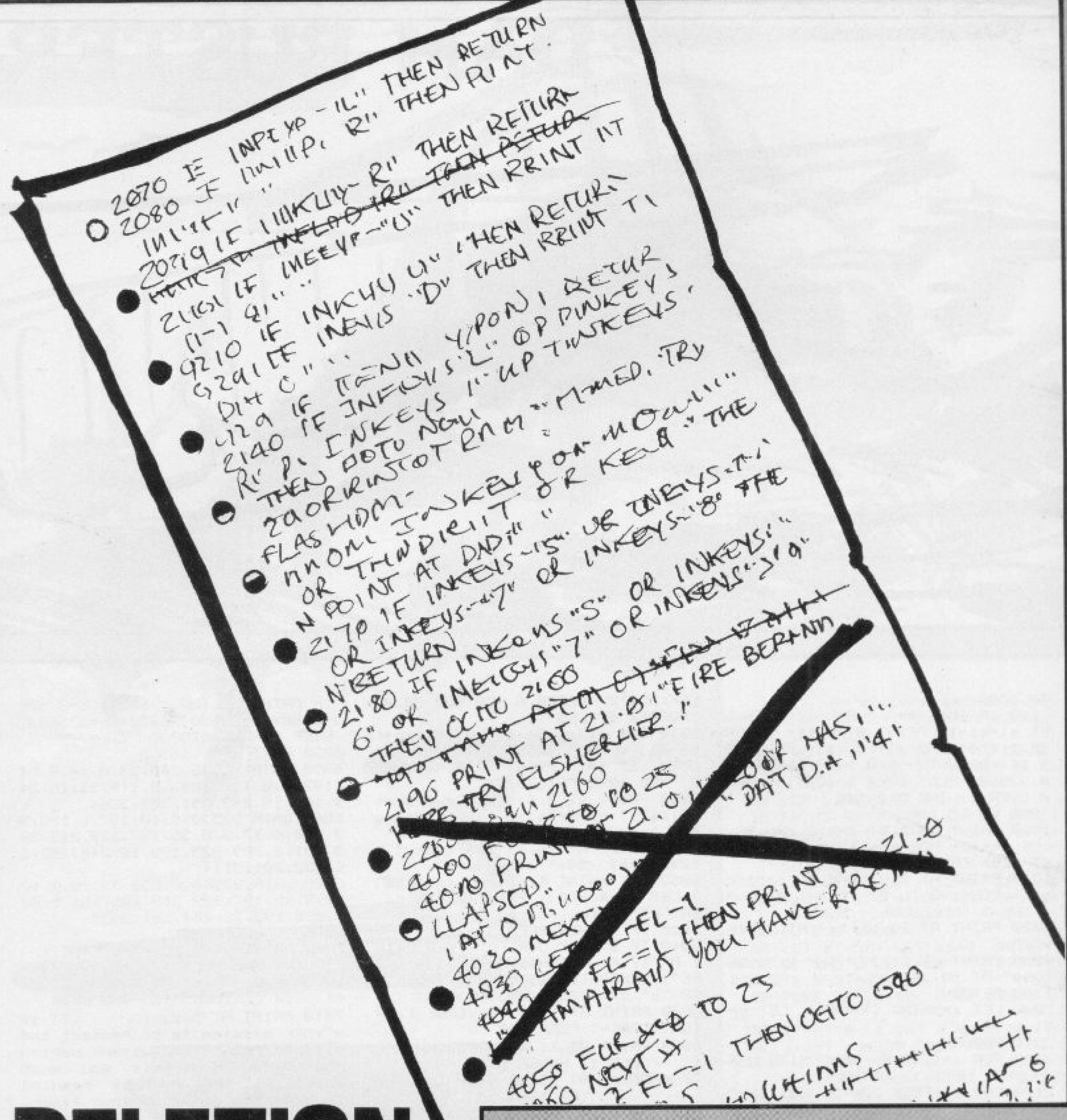
```
   1 LET x$="bbbbbbbbbbbbbbbbbb
bbb": LET y$="cccccccccccccccccc
cccc": GO TO 3
   2 POKE USR "u",0: GO TO 5000
   3 PAPER 7: INK 0: BORDER 7: C
LS
   4 LET t1=0: LET t2=0
   5 PRINT AT 10,4;"Level (1 TO
3) ?": INPUT l: IF l<1 OR l>3 TH
EN GO TO 5
   7 GO SUB 2020
  10 LET su=0: LET as2=0: LET c$
="aaaaaa": LET l=l/3: GO SUB 200
0
  20 GO SUB 1000
  30 LET sl=50: LET as=0: PRINT
AT 0,0;"SHOTS LEFT=50";AT 0,17;"
ROCKETS SHOT=00"
  50 POKE 23673,t2: POKE 23672,t
1
 100 IF ATTR (a,INT b)<>58 AND A
TTR (a,INT b)<>59 THEN PRINT AT
a,INT b;" ": LET b=b-l: IF ATTR
(a,INT b)<>58 THEN PRINT AT a,IN
T b; INK 4;"d": GO TO 130
 105 IF INT b=15 THEN : FOR i=10
 TO 20: PRINT AT a,INT b;"+": BE
EP .01,i: PRINT AT a,INT b;"*":
BEEP .01,i+.5: NEXT i: PRINT AT
a,INT b;" ": LET as=as+1: PRINT
AT 0,30+(as<10); INVERSE 1;as: G
O SUB 2000: GO TO 110
 108 IF as>29 THEN GO TO 2100
 110 IF INT b>8 THEN PRINT AT a,
INT b;("*" AND INT b<>31): FOR i
=0 TO 5: BEEP .001,30-INT b+i: N
EXT i: PRINT AT a,INT b;" ": GO
SUB 2000: GO TO 130
 120 PRINT AT a,INT b;" "
 121 FOR i=5 TO a: FOR j=0 TO 5:
 BEEP .01,i+j: NEXT j: PRINT AT
i,8;"        ": NEXT i
 122 FOR i=7 TO a: PRINT AT i,0;
"        ": BEEP .02,i: NEXT i
 123 FOR i=21 TO 21-(a-6)/2 STEP
 -1: PRINT AT i,14-(6-LEN c$); I
NK 5;x$( TO LEN x$-LEN c$+2): BE
EP .02,i: NEXT i: PRINT AT i,14-
(6-LEN c$); INK 5;y$( TO LEN y$-
LEN c$+2)
 129 FOR i=1 TO 100: NEXT i: GO
```

DAM BUSTER



```
TO 3000
 130 IF INKEY$=" " AND sl THEN L
ET sl=sl-1: PRINT AT 0,11; INVER
SE 1;("0" AND sl<10);sl  PLOT 12
3,16: DRAW INK 3;0,140: LET i=US
R 32560: PLOT OVER 1;123,16: DRA
W OVER 1; INK 3;0,140
 200 GO TO 100
1000 PRINT AT 5,8; INK 2;c$( TO
LEN c$-1): FOR i=6 TO 21: PRINT
AT i,8; INK 2;c$: NEXT i
1010 PRINT AT 7,0; INK 5;"cccccc
cc": FOR i=8 TO 21: PRINT AT i,0
; INK 5;"bbbbbbbb": NEXT i
1020 PRINT AT 20,15;"e";AT 21,15
;"f"
1030 PRINT AT 21,20; INK 1;"999h
1999";AT 20,24;"j"
1100 RETURN
2000 LET a=9+INT (RND*7): LET b=
31
2010 RETURN
2020 FOR i=1 TO 8: RANDOMIZE USR
 32500: NEXT i: RETURN
2100 LET t1=PEEK 23672: LET t2=P
EEK 23673: PAPER 6: GO SUB 2020:
 BORDER 6: CLS
2150 LET su=su+(50-sl): LET as2=
as2+as
2200 PRINT AT 5,8; INK 2;"Well D
one!";AT 8,4; INK 1;"You have cl
eared this";AT 10,6;"Phase of ro
ckets"
2205 PRINT AT 13,4;"You have sho
t ";as2;AT 15,5;"rockets so far"
;AT 17,4;"You have used ";su;AT
19,6;"shots so far"
2207 RANDOMIZE USR 32530
2210 PRINT AT 21,5; FLASH 1;"Pre
ss any key": PAUSE 1: PAUSE 0
2500 LET c$=c$( TO LEN c$-1): PR
INT AT 21,5; OVER 1; PAPER 6;"
             ": IF LEN c$>1 THEN G
O SUB 2020: PAPER 7: INK 0: BORD
ER 7: CLS : GO SUB 2000: GO SUB
1000: GO TO 30
2600 GO SUB 2020: PRINT AT 4,4;
INK 2;"CONGRATULATIONS !";AT 6,0
;"YOU HAVE COMPLETED YOUR MISSIO
N": LET i=0: GO TO 3030
3000 LET t2=PEEK 23673: LET t1=P
EEK 23672: PAPER 6: GO SUB 2020:
 BORDER 6: CLS
3010 LET as2=as2+as: LET su=su+(
50-sl)
3020 LET i=1: PRINT AT 4,4; INK
2;"YOU HAVE FAILED !"
3030 PRINT AT 8,4;"You have shot
 ";as2;" rockets";AT 10,4;"You u
sed ";su;" shots"
3040 PRINT AT 12,4;"You took ";(
t2*256+t1)/50;" seconds"
3050 LET s=INT (as2-(su-as2)/50)
: LET s=s*(s>0): PRINT AT 15,4;
BRIGHT 1;"You scored ";s
3055 IF i THEN BEEP 3,-30
3060 IF s>PEEK USR "u" THEN PRIN
T AT 17,4; FLASH 1;"NEW HIGH SCO
RE": RANDOMIZE USR 32530: POKE U
SR "u",s*(s<256)+255*(s>255)
3070 PRINT AT 19,4; INVERSE 1;"H
IGH SCORE=";PEEK USR "u"
3080 PRINT AT 21,4;"PRESS ANY KE
Y": PAUSE 1: PAUSE 0
3090 PRINT AT 15,4; OVER 1;"
            ";AT 17,4;"
   ";AT 19,4;"               ": G
O SUB 2020: GO TO 1
5000 PAPER 7: INK 0: BRIGHT 0: F
LASH 0: INVERSE 0: OVER 0: BORDE
R 7: CLEAR 32499: PRINT AT 10,5;
"Please wait a moment"
5005 RESTORE 5010: FOR i=USR "a"
 TO USR "j"+7: READ a: POKE i,a:
 NEXT i
5010 DATA 0,254,130,130,130,130,
130,254,102,153,255,255,102,153,
255,255,12,62,127,255,255,255
5020 DATA 255,255,1,3,127,255,25
5,127,3,1,0,16,16,56,16,56,16,56
,56,56,108,198
5030 DATA 238,214,186,124,16,56,
124,254,84,124,84,124,0,42,85,17
1,255,156,148,247,204,252
5040 DATA 252,252,252,204,204,20
4,0,0,0,48,120,252,252,204
6000 RESTORE 6050
6010 FOR x=1 TO 3: LET tot=0: RE
AD b: FOR i=b TO 1e9: READ a: IF
 a<256 THEN POKE i,a: LET tot=to
t+a: NEXT i
6020 IF tot<>a THEN PRINT "ERROR
 IN DATA IN LINE ";6050*(b=32500
)+6060*(b=32530)+6070*(b=32560):
 BEEP 3,-30: STOP
6030 NEXT x
6050 DATA 32500,243,33,0,64,6,24
,197,6,0,126,203,39,119,35,16,24
9,193,16,243,251,201,2264
6060 DATA 32530,6,10,197,6,150,3
3,100,0,17,3,0,35,197,229,213,20
5,181,3,209,225,193,16,244,193,1
6,232,201,3114
6070 DATA 32560,6,200,33,30,0,17
,2,0,35,197,229,213,205,181,3,20
9,225,193,16,244,201,2439
6090 GO SUB 2020
7000 PRINT AT 0,10;: INVERSE 1:
LET i$="DAM BUST": GO SUB 8000:
INVERSE 0: PRINT AT 2,8;: LET i$
="  Tim & Ringo": GO SUB 8000
7010 PRINT AT 5,2;:           LET i$
="Your mission is to Protect the
village from  the  water  behind
the  dam.  To do this, you  must
shoot  all the  rockets  heading
towards the dam with your laser.
  Your  laser  only  has  enough
energy to fire 50 times and  you
must  shoot  down  at  least  30
rockets,before they destroy your
dam.
  If you succeed,  you will face
another  dam  which is  thinner.
There are 5 of these sheets."
7020 GO SUB 8000
7030 PRINT AT 19,1;: LET i$="PRE
SS SPACE TO FIRE YOUR LASER": GO
 SUB 8000
7040 PRINT #1;AT 1,5; FLASH 1;"P
ress any key to begin": PAUSE 1:
 PAUSE 0: PRINT #1;AT 1,5;"
                     ": GO SUB 2020:
 GO TO 1
7999 STOP
8000 FOR i=1 TO LEN i$: PRINT i$
(i);: PAUSE 1+7*(i$(i)<>CHR$ 32)
: NEXT i: RETURN
9000 REM SAVE GAME

9010 CLEAR : SAVE "DAM BUST" LIN
E 2: PRINT AT 10,5;"Verifying":
VERIFY "DAM BUST"
```



DELETION ROUTINE

FREQUENTLY, when devising a program, complete sections of it have to be deleted at a time as the program progresses. David Maxwell of south-west London has written a **Deletion Routine** which will remove whole sections of a program at once. To use it GOTO 9900 and enter the first and last line numbers of the section you want deleted.

```
9900>REM DELETE by D.MAXWELL
9910 CLEAR 65499: RESTORE 9950:
LET a=65500

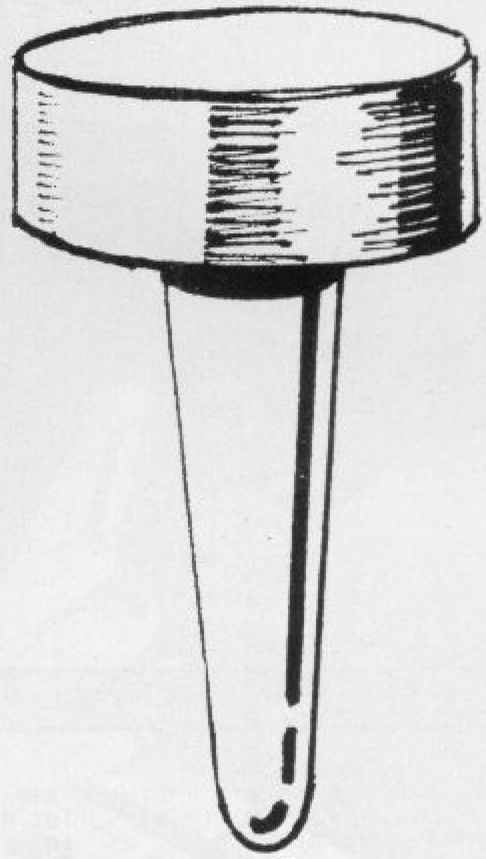
9920 READ n: IF n=257 THEN GO TO
 9970
9930 POKE a,n
9940 LET a=a+1: GO TO 9920

9950 DATA 33,0,0,229,33,0,0,35,2
05,110,25,227,205,110,25
9960 DATA 32,1,235,225,167,237,8
2,216,25,205,229,25,201,257
9970 CLS : PRINT "Start :";: INP
UT a: PRINT a

9975 PRINT "End    :";: INPUT b:
PRINT b
9980 POKE 65501,a-256*INT (a/256
): POKE 65502,INT (a/256)

9990 POKE 65505,b-256*INT (b/256
): POKE 65506,INT (b/256)
9995 RANDOMIZE USR 65500
```

SOLITAIRE



AFTER SEEING the **Solitaire** program in our August edition, K Sen Gupta of Bury, Lancashire submitted this version for the ZX-81. The aim is to end with only one peg remaining in the middle of the board.

Jump one peg over another into a space and the peg you have jumped will be removed. Enter aaaa for a demonstration game and qqqq to begin again.

```
  10 REM "SOLITAIRE"
  15 CLS
  20 FAST
  25 FOR A=2 TO 14 STEP 2
  30 FOR B=6 TO 10 STEP 2
  35 PRINT AT A,B;"o";AT B,A;"o"
;AT 8,8;"O"
  40 PRINT AT 0,A;A/2;AT A,0;CHR
$ (A/2+37)
  45 NEXT B
  50 NEXT A
  55 SLOW
  60 PRINT AT 17,0;"EXAMPLE-  IN
PUT F4D4 MOVES PIECE F4 TO EMPTY
 SPACE D4. E4 AND F4 BECOME EMPT
Y.",,"  ENTER ""AAAA"" FOR PRE-R
ECORDED GAME."
  65 LET C=0
  70 INPUT I$
  75 FOR N=17 TO 21
  80 PRINT AT N,0;"
                              ";
  85 NEXT N
  90 IF I$="AAAA" THEN GOTO 185+
10*(INT (RND*2))
  95 LET A$=I$
 100 IF LEN I$<>4 THEN GOTO 70
 105 IF A$="QQQQ" THEN GOTO 15
 110 LET X1=2*(CODE A$-37)
 115 LET Y1=VAL A$(2)*2
 120 LET X3=2*(CODE A$(3)-37)
 125 LET Y3=VAL A$(4)*2
 130 LET X2=(X1+X3)/2
 135 LET Y2=(Y1+Y3)/2
 140 LET P=1+PEEK 16396+256*PEEK
 16397
 145 LET B$=CHR$ PEEK (33*X1+Y1+
P)
 150 LET C$=CHR$ PEEK (33*X2+Y2+
P)
 155 LET D$=CHR$ PEEK (33*X3+Y3+
P)
 160 IF B$<>"o" OR C$<>"o" OR D$
<>"O" THEN GOTO 70
 165 PRINT AT X1,Y1;"O";AT X2,Y2
;"O";AT X3,Y3;"o";AT C-16*INT (C
/16),20+6*INT (C/16);A$
 170 LET C=C+1
 175 IF I$="AAAA" THEN RETURN
 180 IF C<31 THEN GOTO 70
 185 LET Z$="D2D4B3D3C1C3D3B3A3C
3C4C2E1C1C1C3D5D3C6C4A5C5C5D5E7E
5E4E6C7E7E7E5E2E4G3E3D3F3G5C3G3E
3C4C6A4C4C3C5C6C4D6D4E4E6C4E4E3E
5E6E4F4D4"
 190 GOTO 200
 195 LET Z$="F4D4E6E4C5E5G3C5D5F
5G5E5D4F4B5D5C7C5D5B5A5C5C4C6E7C
7C7C5C3C4A3C3C4C2C1C3E1C1A4C4C4C
2C1C3E2C2C2C4C4C6C6E6E6E4F4D4D4D
2F3D3D2D4"
 200 FOR N=1 TO 31
 205 LET A$=Z$(4*N-3 TO 4*N)
 210 FOR X=1 TO 30
 215 NEXT X
 220 GOSUB 110
 225 NEXT N
```

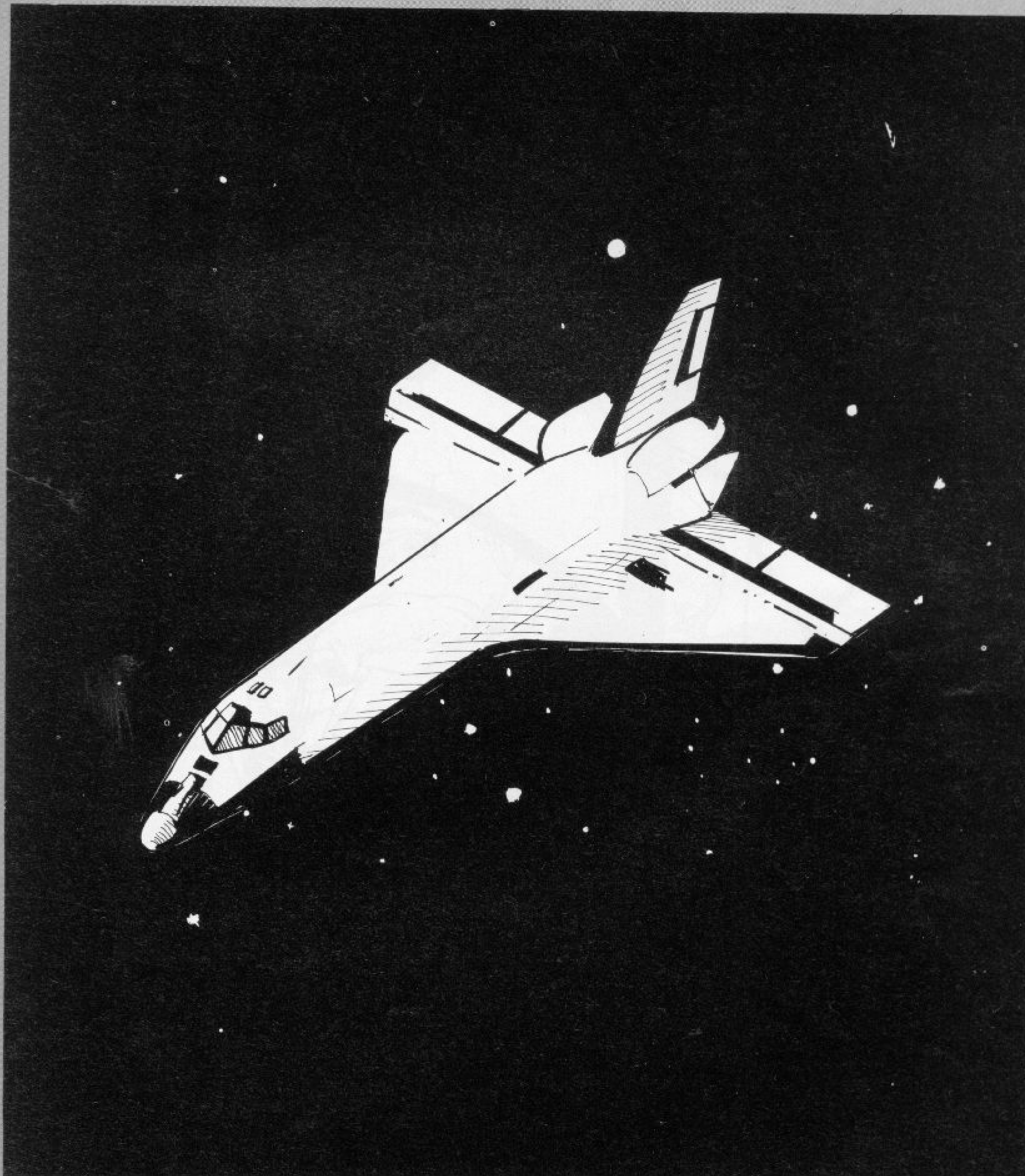
REFUEL-LING

YOUR AIM is to keep the main ship flying for as long as possible. As the capacity of its fuel tanks is limited it is necessary for it to dock with the fuel-carrying cargo ship as often as possible. Press '1' to keep your ship on the level and to consume one unit of fuel, '2' to move it slowly upwards and consume two units of fuel, and '3' to move it quickly upwards consuming three units of fuel.

When no key is pressed the ship will fall earthwards quickly. The game ends if you crash or run out of fuel.

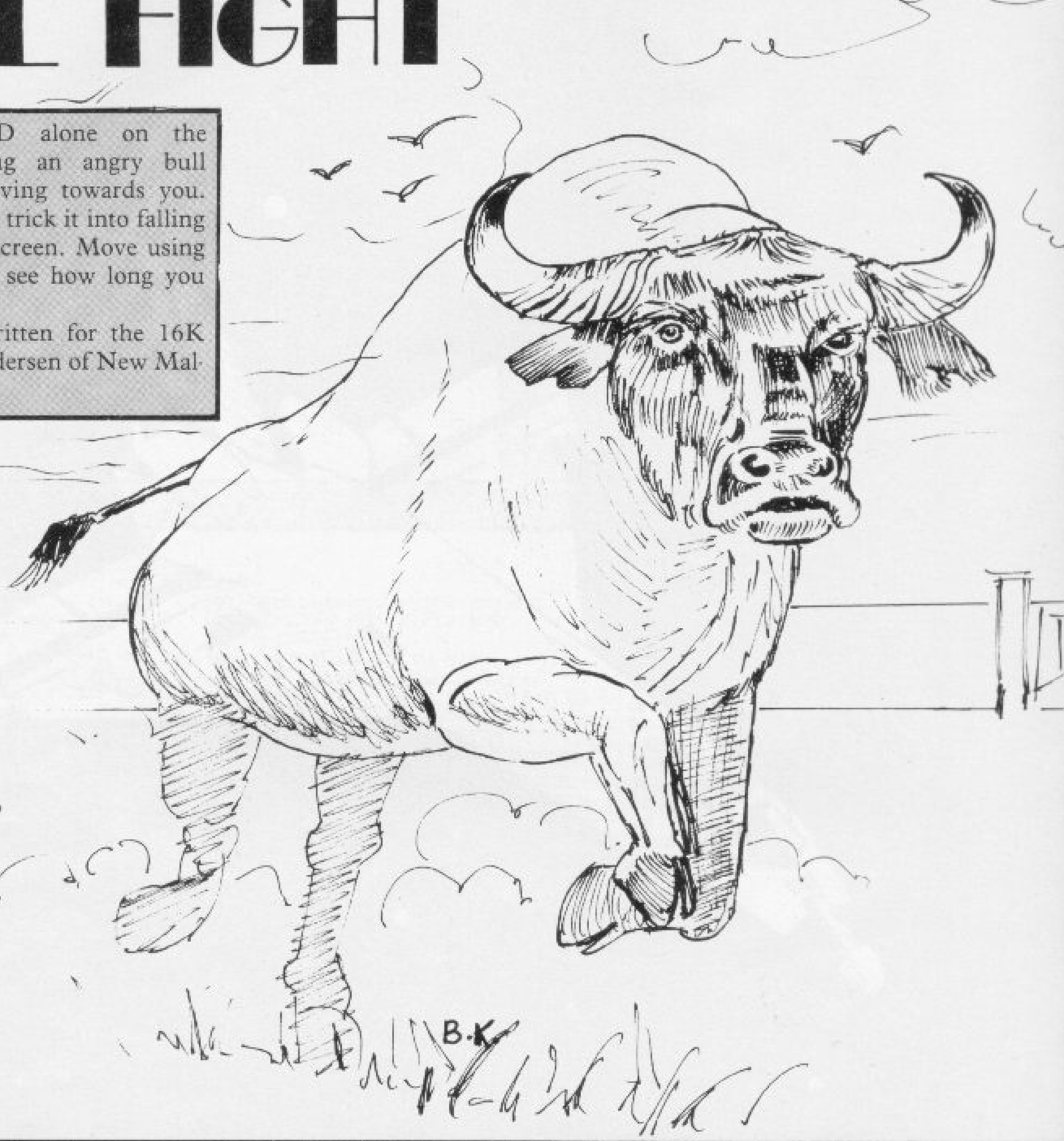
Refuelling was written for the 16K Spectrum by Miguel Pontes Garcia of Barcelona, Spain.

```
   2 POKE 23650,0: BORDER 7: PAP
ER 7: INK 2: CLS : PRINT AT 10,1
0; FLASH 1;"STOP THE TAPE"
   3 PRINT #0; FLASH 1;AT 0,0; B
RIGHT 1;"      Press any key to s
tart      ": PAUSE 0: CLS : GO TO
 10
   4 PRINT AT 10,0;"Do you want
instructions? (y/n) ": PAUSE 0:
IF INKEY$<>"y" THEN GO TO 32
   6 GO SUB 2000
   7 GO TO 32
   8 PAUSE 1: IF INKEY$="" THEN
BORDER 0: BORDER 2: BORDER 6: BO
RDER 4: BORDER 5: BORDER 0: GO T
O 8
   9 RETURN
  10 REM initialisation
  15 CLEAR 32499
  20 BORDER 5: PAPER 5: INK 9: C
LS : PRINT FLASH 1; BRIGHT 1;AT
10,0;"Please wait,I'm making UDG
s and      placing M/C in memory
      ": PAUSE 50
  30 GO SUB 1000: GO TO 1200
  31 CLS : GO TO 4
  32 REM main loop
  35 CLS : LET h=0: LET l=14: BE
EP .2,30: BEEP .2,20: BEEP .2,30
: LET g=0: LET p=13: LET d=l: LE
T j=0: LET f$="      ": FOR i=0 T
O 6: RANDOMIZE USR 32529: NEXT i
  38 LET k=INT (RND*11)+3: PRINT
 INK 0;AT 21,0;"(3*isp)a(4*i93)b
(3*isp)a(4*i93)b(4*isp)a(6*i93)b
(2*isp)"
  40 FOR f=1 TO 25 STEP 1+INT (R
ND*2)
  42 PRINT AT 0,21;"Time=";g: LE
T g=g+1
  50 PRINT AT d,12;f$;AT d+1,12;
f$;AT d+1,p;"   ";AT d+2,p;"   "
;AT k,f;"   cde";AT l,12;"fghij"
;AT 0,0;"Fuel=";60-j;"    ": LET
 d=l: LET l=l+1
  70 REM main ship crashes
  80 IF l>-21 THEN GO TO 210
  85 REM reserve tank engaging
  90 IF j>=60 THEN PRINT AT 1,0;
 FLASH 1;"Reserve"
  92 REM detects out of fuel
  95 IF j>=75 THEN GO TO 350
  97 REM detects contact
 100 IF f=10 AND l-2=k THEN GO T
O 240
 101 REM Detects ships crash
 102 IF f>=6 AND f<=12 AND (l-1=
k OR l=k) THEN GO TO 310
 103 REM resets power display
 105 PRINT AT 1,12;"______";AT 0
,12;"Power"
 107 REM keyboard scanning
 110 LET x=IN 63486: IF x=251 TH
EN BEEP .1,-20: GO TO 160
 113 IF x=253 THEN BEEP .1,-10:
GO TO 280
 115 IF x=254 THEN BEEP .1,0: GO
 TO 260
 120 IF l<3 THEN LET l=3
 130 PRINT AT 1,7;f$
 140 NEXT f
 145 PRINT AT k,f+1;f$
 147 REM main loop ends here
 150 GO TO 38
 155 REM full ascensional power
 160 LET l=l-3
 170 PRINT AT l+3,p;"kkk";AT 1,1
2;"(6*isp)";AT 0,12;"Power": LET
 j=j+3
 200 GO TO 120
 205 REM main ship crashes
 210 PRINT FLASH 1; INK 2; PAPER
 6;AT 19,12;"lllll";AT 20,13;"ll
l": PRINT AT 21,11;"(isp)a(i93)l
(2*i93)": FOR i=0 TO 10: RANDOMI
ZE USR 32529: NEXT i: PAUSE 100:
 GO TO 35
 220 REM contact routine
 240 PRINT AT 1,11;"CONTACT": FO
R i=0 TO 2: RANDOMIZE USR 32500:
 NEXT i: PAUSE 25: PRINT AT 1,11
;"       ": LET h=h+1: PRINT AT
1,21;"Contacts=";h: LET j=0: GO
TO 140
 250 REM low ascensional power
 260 LET l=l-1: LET j=j+1: PRINT
 AT l+1,14;"k";AT 1,12;"(2*isp)_
___";AT 0,12;"Power": GO TO 120
 270 REM medium power
 280 LET l=l-2: PRINT AT l+2,13;
"k k";AT 1,12;"(4*isp)__";AT 0,1
2;"Power": LET j=j+2: GO TO 120
 300 REM both ships crash
 310 PRINT AT d,12;f$: FLASH 1:
PRINT INK 2; PAPER 6;AT k,f+3;"l
ll";AT k+1,f+4;"l";AT k-1,f+4;"l
";AT l,12;"lllll";AT l+1,13;"lll
";AT l-1,13;"lll";AT l+2,14;"l";
AT l-2,14;"l": FLASH 0: FOR i=0
TO 10: RANDOMIZE USR 32529: RAND
OMIZE USR 32500: NEXT i: PAUSE 1
00: GO TO 35
 320 STOP
 999 REM User defined graphics
1000 FOR f=USR "a" TO USR "l"+7
1010 READ g: POKE f,g: BEEP .01,
30: NEXT f
1020 DATA 128,192,224,224,255,25
5,255,255
1030 DATA 1,7,15,63,255,255,255,
255
1040 DATA 31,49,119,242,247,119,
55,31
1050 DATA 255,81,87,83,87,87,17,
255
1060 DATA 248,124,126,127,127,12
6,28,248
1070 DATA 0,0,6,31,63,31,0,0
1080 DATA 3,63,127,255,255,255,1
6,56
1090 DATA 255,255,255,255,255,25
5,16,56
1100 DATA 192,252,254,255,255,25
5,16,56
1110 DATA 0,0,96,251,252,254,4,3
1120 DATA 24,24,60,124,60,24,74,
40
1130 DATA 129,82,37,208,128,36,8
2,161
1140 RETURN
1150 REM M/C sound routines
1200 FOR a=0 TO 55
1205 READ b
1210 POKE 32500+a,b: DEEP .01,10
: NEXT a
1220 DATA 6,1,197,33,15,0,17,20,
0,229,205,181,3,225,17,16,0,167,
237,90,125,254,255,32,237,193,16
,230,201: REM first sound
1230 DATA 0,6,1,197,33,0,3,17,1,
0,229,205,181,3,225,17,16,0,167,
237,82,32,240,193,16,233,201:
REM second sound
1240 GO TO 31
2000 REM instructions
2010 CLS : PRINT "     *** Star r
efuelling ***     "
2020 PRINT '"     The idea of the
```



```
 game is to  keep the main ship
(fghij)      flying as long as p
ossible.        As the fuel tan
ks of this   ship are limited,yo
u have to    meet the refuelling
 ship (cde)  to take fuel for yo
ur flight.         "
2030 PRINT '"      An encounter of
 two ships inthe space is a very
 hard work,  this is because the
 movements   are so much faster
than in the  atmosphere,but the
gravity is   also important,if y
ou leave the controls you will c
rash.           "
2040 PRINT #0; FLASH 1;AT 0,0;"
  Press any key to continue    "
2045 GO SUB 9: BORDER 5
2050 CLS
2060 PRINT ''"The control keys a
re these:       "; PRINT '"    1 i
s to keep your ship at       the
 actual level.                The
 power consumption is 1"
2070 PRINT '"    2 is to advance
 at low speed    this speed is i
deal to meet     the fuel ship.I
t consumes 2"
2080 PRINT '"    3 is for full s
peed.            It's power cons
umption is 3"
2090 PRINT ''"You must approach
to refuelling ship by the under
side of it,    otherwise you will
 crash.          "
2100 PRINT £0; FLASH 1;AT 0,0;"
  Press any key to continue    "
2105 GO SUB 8
2110 BORDER 5: CLS
3000 RETURN
3010 CLEAR : SAVE "Refuelling" L
INE 1
```

BULL FIGHT



YOU STAND alone on the screen, facing an angry bull which is moving towards you. Your only hope is to trick it into falling into the pit on the screen. Move using the cursor keys and see how long you can survive.

Bullfight was written for the 16K ZX-81 by Philip Andersen of New Malden, Surrey.

```
   1 CLS
   2 PRINT AT 0,0;"bullfight"
   3 PRINT AT 2,0;"YOU MUST MOVE
 YOUR BULLFIGHTER  AROUND THE AR
ENA TO ESCAPE THE  BULL WHICH IS
 RELENTLESSLY      PERSUING-YOU.
YOUR ONLY HOPE IS  TO MAKE HIM F
ALL INTO THE PIT   BY POSITIONIN
G IT BETWEEN YOU   AND HIM.USE T
HE KEYS 5,6,7 AND 8TO MOVE IN TH
E DIRECTIONS SHOWN BY THE ARROWS
."
   4 PRINT AT 13,1;"O=BULLFIGHTE
R",,,," *=BULL",,,," (1sP)=PIT"
   5 PRINT AT 21,0;"ANY KEY TO S
TART"
   6 IF INKEY$="" THEN GOTO 6
   7 CLS
   8 POKE 16418,0
  10 FOR F=0 TO 31
  20 PRINT AT 0,F;"(9a)";AT 21,F
;"(9a)"
  30 NEXT F
  40 FOR F=1 TO 20
  50 PRINT AT F,0;"(9a)";AT F,31
;"(9a)"
  60 NEXT F
  70 LET S=0
  80 LET X=INT (RND*30+1)
  90 LET Y=INT (RND*20+1)
 100 LET A=INT (RND*30+1)
 110 LET B=INT (RND*20+1)
 120 LET M1=INT (RND*28+2)
 130 LET M2=INT (RND*18+2)
 135 PRINT AT B,A;"*"
 140 PRINT AT M2,M1;"(1sP)"
 150 PRINT AT Y,X;" "
 160 LET X=X+(INKEY$="8")-(INKEY
$="5")
 170 LET Y=Y+(INKEY$="6")-(INKEY
$="7")
 171 LET X=X+(X<1)-(X>30)
 172 LET Y=Y+(Y<1)-(Y>20)
 180 PRINT AT Y,X;"O"
 190 IF RND>.7 THEN GOTO 240
 200 PRINT AT B,A;" "
 210 LET A=A+(A<X)-(A>X)
 220 LET B=B+(B<Y)-(B>Y)
 230 PRINT AT B,A;"*"
 240 IF A=X AND B=Y THEN GOTO 40
0
 250 IF A=M1 AND B=M2 THEN GOTO
600
 260 LET S=S+1
 270 GOTO 140
 400 GOSUB 800
 410 PRINT AT 0,0;"SCORE=";S
 415 PRINT AT 22,0;"RATING=";
 416 IF S<200 THEN PRINT "BULL F
UDDER"
 417 IF S>=200 AND S<440 THEN PR
INT "APPRENTICE"
 418 IF S>=440 AND S<660 THEN PR
INT "PICADOR"
 419 IF S>=660 AND S<1100 THEN P
RINT "MATADOR"
 420 IF S>=1100 THEN PRINT "TORE
ADOR"
 428 PRINT AT 23,0;"ANY KEY TO P
LAY AGAIN"
 429 IF INKEY$="" THEN GOTO 429
 430 PRINT AT B,A;" ";AT M2,M1;"
"
 440 PRINT AT 0,0;"(10*9a)"
 445 PRINT AT 22,0;"
                 "
 446 PRINT AT 23,0;"
                 "
 450 GOTO 70
 600 GOSUB 800
 610 PRINT AT B,A;" "
 620 LET S=S+200
 630 FOR F=1 TO 60
 640 NEXT F
 650 GOTO 100
 800 FOR F=1 TO 8
 810 PRINT AT B,A;"(1*)";TAB RND
;AT B,A;"*"
 820 NEXT F
 830 RETURN
9998 SAVE "BULLFIGHt"
9999 RUN
```

FIREMAN



YOU ARE a **Fireman,** trapped in a burning building. The only way out is to make your way to the roof to escape to a neighbouring building. As you move up the building, using cursor keys 5, 6, 7 and 8, the fire will spread more and more rapidly. As you are wearing a flameproof suit you can withstand small amounts of heat but running into a wall you will burn to death.

Written for the 16K ZX-81 by C R Draper of Beverley Hills, Leamington Spa.

```
   1 REM "FIREMAN
   2 GOSUB 5000
   3 LET FL=1
   5 FAST
   6 CLS
   7 LET P=1+PEEK 16396+PEEK 163
97*256
  10 REM floor Plan
  20 PRINT AT 0,0;"(3*isP)FIREMA
N(11*isP)FLOOR ";FL;"(3*isP)"
  30 FOR X=0 TO 30
  40 PRINT AT 1,X;"(isP)";AT 20,
X;"(isP)"
  50 NEXT X
  60 FOR Y=2 TO 19
  70 IF FL<=1 THEN LET Z=10
  80 IF FL=2 THEN LET Z=11
  90 IF FL=3 THEN LET Z=12
 100 IF FL=4 THEN LET Z=13
 110 IF FL=5 THEN LET Z=14
 120 IF FL=6 THEN LET Z=15
 130 IF FL=7 THEN LET Z=16
 140 IF FL=8 THEN LET Z=18
 150 FOR N=6 TO Z
 160 PRINT AT Y,0;"(isP)";AT Y,3
0;"(isP)";AT Y,INT (RND*30);"(is
P)"
 170 NEXT N
 180 NEXT Y
 190 PRINT AT 2,0;" ";AT 19,30;"
"
 200 SLOW
 210 PRINT AT 21,0;"DO NOT TOUCH
 WALLS OR YOU BURN. "
 220 FOR X=0 TO 50
```

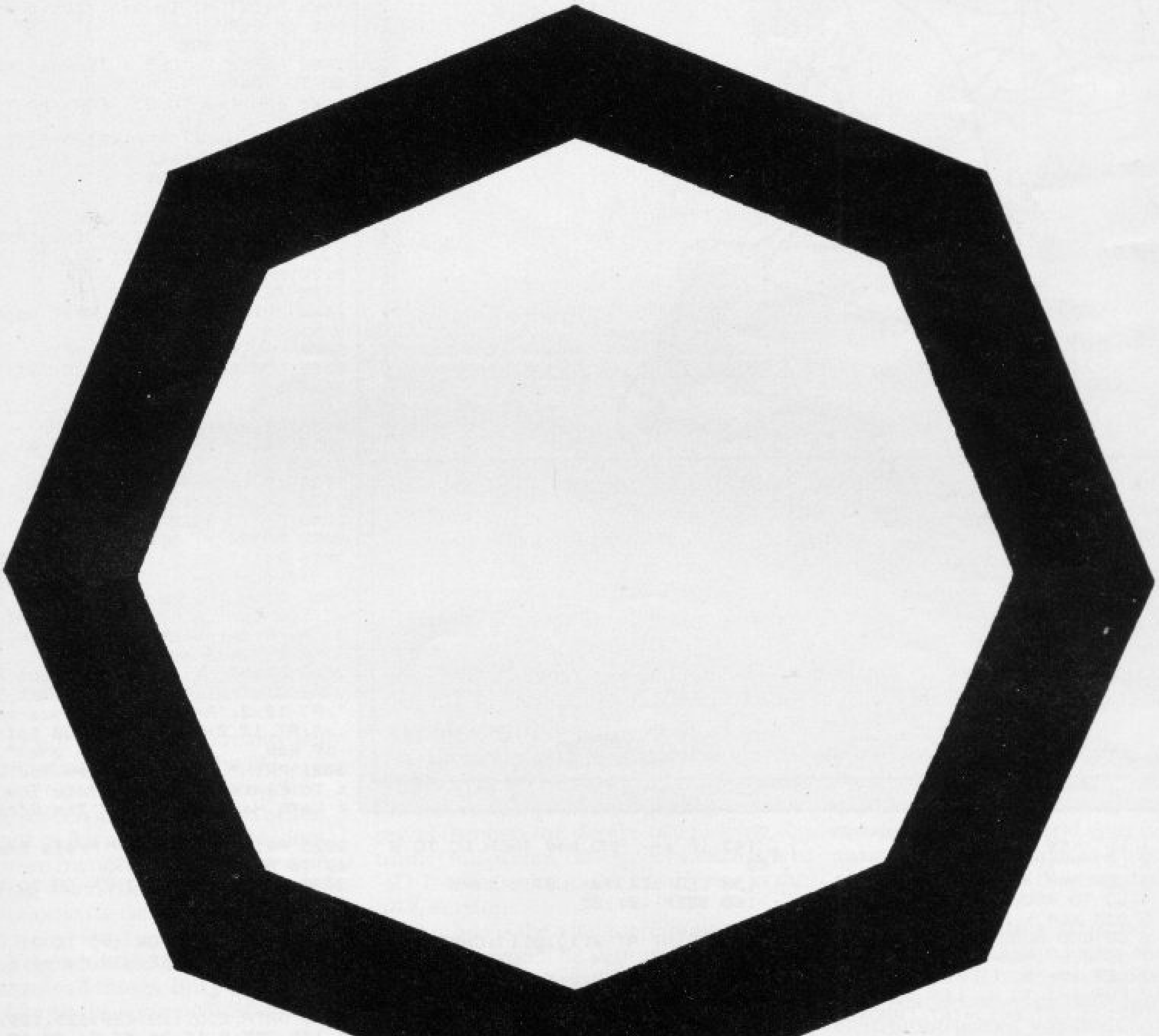
```
 230 NEXT X
 300 LET F=0
 310 LET A=0
 320 LET D=2
 330 PRINT AT D,A;"*";AT D,A;" "
 350 LET K=INT (RND*50)
 360 IF A<10 AND D<6 THEN GOTO 4
80
 370 IF K>A THEN GOTO 480
 380 PRINT AT D,A;"*"
 390 FOR N=1 TO 10
 400 LET W=INT (RND*18)+2
 410 LET F=F+1
 420 PRINT AT W,F;"(9a)"
 430 IF F=A AND W=D THEN PRINT A
T D,A;"(9a)"
 440 IF F=A AND W=D THEN GOTO 46
00
 450 IF F=29 THEN LET F=0
 460 NEXT N
 470 PRINT AT D,A;" "
 480 PRINT AT 21,0;"IF YOU NEED
HELP PRESS KEY H.    "
 490 IF INKEY$="H" THEN PRINT AT
 D,A;"*"
 500 IF INKEY$="H" THEN GOSUB 20
00
 510 PRINT AT D,A:" "
 520 LET A=A+(INKEY$="8")-(INKEY
$="5")
 530 LET D=D+(INKEY$="6")-(INKEY
$="7")
 540 LET P1=PEEK (P+33*D+A)
 550 IF P1=128 THEN GOTO 600
 560 PRINT AT D,A;"*"
 570 IF D=19 AND A=30 THEN GOTO
1000
 580 GOTO 330
 600 PRINT AT 21,0;"CONTACT WITH
 WALLS INSTANT DEATH"
 610 FOR X=0 TO 50
 620 NEXT X
 630 PRINT AT 21,0;"NEW GAME? PR
ESS Y OR N.         "
 640 IF INKEY$="" THEN GOTO 640
 650 IF INKEY$="Y" THEN GOTO 3
 660 IF INKEY$="N" THEN PRINT AT
 21,0;"OKAY, BYE.
      "
 670 FOR N=0 TO 25
 680 NEXT N
 690 CLS
 700 PRINT AT 3,7;"*************
****";AT 4,7;"*                *"
;AT 5,7;"* F 1 R E M A N *":AT 6
,7;"*                *":AT 7,7:"*
****************"
 710 STOP
1000 REM floor change
1010 LET FL=FL+1
1030 IF FL>8 THEN GOTO 1100
1030 PRINT AT 21,0:"GOING UP TO
FLOOR ";FL;"              "
1040 FOR X=0 TO 21
1050 SCROLL
1060 NEXT X
1070 GOTO 5
1100 REM roof escape
1110 CLS
1120 PRINT AT 21,0;"YOU HAVE MAD
E IT TO THE ROOF.    "
1130 FOR X=20 TO 5 STEP -1
1140 PRINT AT X,0;"(9a)";AT X,1;
"(9a)";AT X,2;"(9a)";AT X,3;"(9a
)";AT X,4;"(9a)";AT X,5;"(9a)";A
T X,21;"(isp)";AT X,22;"(isp)";A
T X,23;"(isp)"
1150 NEXT X
1160 FOR X=6 TO 20
1170 PRINT AT 5,X;"-"
1180 NEXT X
1190 LET A=4
1200 PRINT AT 4,A;"*":AT 4,A;" "
1220 LET A=A+(INKEY$="8")
1230 IF.A=22 THEN GOTO 1250
1240 GOTO 1200
1250 FOR X=4 TO 20
1260 PRINT AT X,22;"*";AT X,22;"
"
1280 NEXT X
1290 CLS
1300 PRINT AT 10,0;"CONGRATULATI
ONS, YOU ESCAPED.   "
1310 GOTO 630
2000 REM help
2010 LET H=INT (RND*3)
2020 IF D<=5 AND A<=5 THEN LET H
=2
2030 IF H=0 THEN GOTO 2150
2040 IF H=1 THEN GOTO 2190
2050 IF H=2 THEN PRINT AT 21,0;"
WHERE DO YOU WISH TO GO? L,R,U,D
"
2060 IF INKEY$="L" THEN PRINT AT
 D,A-1;" "
2070 IF INKEY$="L" THEN RETURN
2080 IF INKEY$="R" THEN PRINT AT
 D,A+1;" "
2090 IF INKEY$="R" THEN RETURN
2100 IF INKEY$="U" THEN PRINT AT
 D-1,A;" "
2110 IF INKEY$="U" THEN RETURN
2120 IF INKEY$="D" THEN PRINT AT
 D+1,A;" "
2130 IF INKEY$="D" THEN RETURN
2140 IF INKEY$<>"L" OR INKEY$<>"
R" OR INKEY$<>"U" OR INKEY$<>"D"
 THEN GOTO 2060
2150 PRINT AT 21,0;"JAMMED, TRY
ELSEWHERE.         "
2160 IF INKEY$="5" OR INKEY$="6"
 OR INKEY$="7" OR INKEY$="8" THE
N PRINT AT D,A;" "
2170 IF INKEY$="5" OR INKEY$="6"
 OR INKEY$="7" OR INKEY$="8" THE
N RETURN
2180 IF INKEY$<>"5" OR INKEY$<>"
6" OR INKEY$<>"7" OR INKEY$<>"8"
 THEN GOTO 2160
2190 PRINT AT 21,0;"FIRE BEHIND
HERE TRY ELSEWHERE. "
2200 GOTO 2160
4000 FOR X=0 TO 25
4010 PRINT AT 21,0;"FLOOR HAS CO
LLAPSED.            ";AT D,A;"*"
;AT D,A;"(9a)"
4020 NEXT X
4030 LET FL=FL-1
4040 IF FL=-1 THEN PRINT AT 21,0
;"I AM AFRAID YOU HAVE PERISHED.
  "
4050 FOR X=0 TO 25
4060 NEXT X
4070 IF FL=-1 THEN GOTO 640
4080 GOTO 5
5000 REM instructions
5010 PRINT AT 3,7;"*************
****";AT 4,7;"*                *"
;AT 5,7;"* F 1 R E M A N *";AT 6
,7;"*                *";AT 7,7:"*
****************"
5020 PRINT AT 21,0;"PRESS ANY KE
Y TO CONTINUE.         "
5030 IF INKEY$="" THEN GOTO 5030
5040 CLS
5050 PRINT "YOU ARE A FIREMAN TR
APPED IN A  TALL BUILDING. YOU A
RE ON THE   FIRST FLOOR. IF YOU
GO DOWN YOU CANNOT GET OUT. THE
ONLY ESCAPE IS TO GO TO THE ROOF
 WHERE YOU  CAN CROSS TO THE NEX
T BUILDING."
5060 PRINT
5070 PRINT "IF YOU TOUCH ANY WAL
LS YOU WILL DIE INSTANTLY. IF YO
U FIND IT   DIFFICULT TO GET THR
OUGH THERE  MAY BE HELP AVAILABL
E."
5080 PRINT
5090 PRINT "FORTUNATELY YOU HAVE
 AN ASBESTOSSUIT ON, SO YOU CAN
WALK THROUGHTHE FIRE. THE FIRE M
AY EVEN BURNA WAY THROUGH,OR IT
MAY HINDER  YOU."
5100 PRINT
5110 PRINT "GOOD LUCK."
5120 PRINT AT 21,0;"PRESS ANY KE
Y TO CONTINUE.         "
5130 IF INKEY$="" THEN GOTO 5130
5140 RETURN
6000 SAVE "FIREMAn"
6010 RUN
```



POLYGON

POLYGON, written for the 1K ZX-81 by G Hitchmough of Liverpool, will draw regular polygons of up to eight sides, in random order, and you are asked to name them. If you answer correctly your score will increase. If the correct answer will be printed and the program will end.

```
  1 FAST
  2 LET S=PI-PI
  3 LET A$="TRIANGLESQUARE  PEN
TAGONHEXAGON HEPTAGONOCTAGON "
 10 LET X=CODE "?"
 15 LET I=SGN PI
 20 LET Y=I+1
 40 LET N=VAL "INT (RND*6+3)"
 45 CLS
 50 PRINT "NO SIDES:";N;" SCORE
:";S
 60 LET A=Y*PI/N
 70 FOR B=I TO N
 80 LET P=COS (A*B)
 90 LET Q=SIN (A*B)
100 FOR C=1 TO CODE "<"-N
110 LET X=X+P
120 LET Y=Y+Q
130 PLOT X,Y
140 NEXT C
150 NEXT B
170 INPUT B$
180 LET A$=A$(N*CODE "(9a)"-23
TO N*CODE "(9a)"-16)
182 IF A$(LEN A$)<>" " THEN GOT
O CODE "(19)"
183 LET A$=A$( TO LEN A$-I)
184 GOTO CODE "(19)"
190 IF B$=A$ THEN GOTO CODE ">="
"
200 PRINT AT I,I-I;"WRONG IT IS
NOT A ";B$,"BUT A ";A$
210 STOP
220 LET S=S+I
230 GOTO PI
```



RUNNER



STEER your **Runner** round the board with the usual cursor keys, avoiding the ghosts which are determined to steal your power. They will always move towards you but cannot move through the purple blocking squares. Run through the energy squares to gain power but do not lead the ghosts through them or they will eat them.

You gain 100 points for running through an energy square, lose one pont for each move, lose 50 points for running through a purple square, and gain bonus points for progressing to a new board. A new board can be reached by moving into the top left-hand corner.

The program was written for the 16K Spectrum by A Wilkinson of Chingford, London. All underlined letters should be entered in graphics mode.

```
   1 LET k=0
   2 LET p=100
   3 LET g=0
   4 GO TO 4000
   5 DIM a(4): DIM b(4)
   6 GO SUB 3000
   7 GO SUB 1000
   9 LET s$="B"
  10 FOR i=1 TO 4: LET a(i)=INT
 (RND*21): LET b(i)=INT (RND*22):
 NEXT i
  20 LET x=21: LET y=31
 100 FOR t=1 TO 2: FOR i=1 TO 4
 110 PRINT AT a(i),b(i);" "
 120 LET a=a(i)+SGN (x-a(i))
 130 LET b=b(i)+SGN (y-b(i))
 140 IF ATTR (a,b)=24 THEN GO TO
 190
 145 IF a=x AND b=y THEN GO TO 8
00
 150 LET a(i)=a: LET b(i)=b
 160 BEEP .01,25

 190 PRINT AT a(i),b(i);CHR$ (14
9+t)
 195 PRINT AT x,y;" "
 200 IF INKEY$="5" THEN LET y=y-
1: LET s$="B"
 210 IF INKEY$="6" THEN LET x=x+
1: LET s$="D"
 220 IF INKEY$="7" THEN LET x=x-
1: LET s$="E"
 230 IF INKEY$="8" THEN LET y=y+
1: LET s$="C"
 240 IF x<0 THEN LET x=0
 250 IF x>21 THEN LET x=21
 260 IF y<0 THEN LET y=0
 270 IF y>31 THEN LET y=31
 280 IF ATTR (x,y)=24 THEN PRINT
 AT x,y; PAPER 2;"F": LET p=p-50
: BEEP .1,-10
 290 LET p=p-1
 291 IF p<1 THEN GO TO 900

 295 IF ATTR (x,y)=48 THEN PRINT
 AT x,y;"*": BEEP .05,20: LET p=
p+100
 298 IF x=0 AND y=0 THEN GO TO 2
000
 299 BEEP .01,RND*20
 300 PRINT AT x,y; INK 1;s$
 310 PRINT AT 0,0; PAPER 5;p; PA
PER 3;"AAA"
 400 NEXT i
 405 NEXT t
 410 GO TO 100
 800 PRINT AT 8,10;" BAD LUCK "
 801 PRINT AT x,y; PAPER 4;"G"
 805 BEEP .3,-10
 810 PRINT AT 10,8;"You Were Cho
mPed "
 820 PRINT AT 12,4;"You Got thro
ugh ";g;" Boards"
 830 PRINT AT 14,10;"BONUS POINT
S=";INT (g^1.5*100);AT 16,10;"TO
TAL=";INT (g^1.5*100)+p

 850 GO TO 2010
 900 PRINT AT 10,1;" You've Run
Out of Puff ! "
 910 GO TO 820
1000 PAPER 7: CLS : IF k=0 THEN
GO TO 1060
1005 FOR i=0 TO 21: FOR J=0 TO 3
1
1010 IF RND<k THEN PRINT AT i,J;
 PAPER 3;"A": BEEP .01,20
1040 NEXT J: NEXT i
1060 BORDER 3
1100 FOR i=1 TO 20
1110 PRINT PAPER 6;AT INT (RND*2
1),INT (RND*31);"I"
1120 NEXT i
1130 RETURN
2000 PRINT AT 10,5;" Well Done S
o Far "
2002 PAUSE 100: LET g=g+1
2005 FOR i=1 TO 20: BEEP .01,i:
NEXT i

2006>LET k=k+.05: GO TO 7
2010 PRINT AT 21,0; PAPER 6;" AN
OTHER GO ?  Y/N "
2020 IF INKEY$="y" THEN RUN
2030 IF INKEY$="n" THEN STOP
2040 GO TO 2020
3000 PAPER 7: BORDER 5: CLS
3010 PRINT AT 2,10;"WELCOME";AT
4,1;"Your Man (BCDE) Can Be Stee
red  With The Arrow Keys";AT 6,2
;" You Can Collect Points";AT 7,
2;"By Picking UP Energy From I";
AT 8,2;"Squares"
3020 PRINT AT 10,2;"Look Out For
 The G's";AT 11,2;"Which Eat You
";AT 12,2;"And The 'A' Squares..
..";AT 13,2;"(you lose 50 Points
 if you              smash one)"
3021>PRINT AT 15,2;"When You Wan
t To Finish, Run      Into The To
p Left Hand Corner Of The Screen
"
3025 PRINT : PRINT " Press Any K
ey To Start"
3030 IF INKEY$="" THEN GO TO 303
0
3040 RETURN
4000 RESTORE : FOR i=0 TO 71
4020 READ a: POKE USR "a"+i,a
4030 NEXT i
4040 GO TO 5
4050 DATA 255,129,129,129,129,12
9,129,255,0,16,24,56,24,20,18,0
4060 DATA 0,8,24,28,24,40,72,0,0
,8,28,28,56,20,20,4
4070 DATA 16,56,60,24,56,40,40,3
2,74,32,133,0,65,16,69,138
4080 DATA 24,126,90,126,36,60,90
,165,24,126,90,126,60,36,90,90,1
70,1,188,17,136,61,128,85
```



Take a giant step closer to reality with New Generation Software. The 3D Graphics of New Generation programs bring the screen alive and makes other games look as flat as snakes and ladders.

Spectrum owners will find that seeing is believing when they open the door on 'THE CORRIDORS OF GENON', the latest creation from New Generation. You will be saving the Universe from the evil that now controls all things. But beware – the sound of footsteps approaching could be Bogul!

Hurtle into a void leaving a trail for your unseen pursuers in 'KNOT IN 3D'. Weave your way through up to five trails but be careful, you could get knotted! Or travel through the depths of a moving tunnel full of bats, rats, spiders and toads in '3D TUNNEL', with a special surprise in the 48 K version.

Stamina is the vital ingredient of 'ESCAPE', as you'll be venturing into the maze pursued by walking and flying dinosaurs.

ZX81 owners must be prepared for the shock of coming face to face with the T. Rex that leaps out from '3D MONSTER MAZE'. '3D DEFENDER' takes you out of this world and plunges you into space in a fast moving game to defend your home planet against alien spacecraft in a blitz of explosions, plasma blasts and photon beams.

All these exciting 3D games have been designed by Malcolm Evans, the 3D expert. They'll have you leaping out of your seat because you don't just play New Generation games, you live them.

Corridors of Genon for 48K Spectrum £5.95
Knot in 3D for 48K Spectrum £5.95
'The most outstanding thing you'll see for a long time' Popular Computing Weekly
3D Tunnel for 16K/48K Spectrum £5.95
'A masterpiece of programming' Computer and Video Games

Escape for 16K Spectrum £4.95
'One of the best and most original games we have seen for the Spectrum' Sinclair User
3D Monster Maze for 16K ZX81 £4.95
'Brilliant, Brilliant, Brilliant . . .' Popular Computing Weekly
3D Defender for 16K ZX81 £4.95
'Another 3D Winner' Sinclair User

New Generation Software

Available from **W H Smith, Boots, Menzies, Spectrum Group** and all leading computer stores.

FREEPOST Bath BA2 4TD Tel 0225-316924
Mail order by return

SPOT THE DIFFERENCE!

Choosing which game to buy from the mountain available is a difficult job, especially when everyone claims to produce the best on the market. But how can you tell the best from the rest?. To help you decide, read on. . . .



THE DUNGEON MASTER

Let your Spectrum be your guide in a totally new dimension in adventures in the true spirit of traditional role playing games where YOU design the scenario.

"I have been a Dungeons and Dragons fan for several years....The package provides excellent entertainment for all fans of the cults and should prove a good introduction to the game". ....Sinclair User.

"Highly recommended for its versality, originality and quality. Definately well worth obtaining". ....ZX Computing.

ZX Spectrum 48K **£7.50**
Written by Graham Stafford.

What the real critics say. . . .

Very rarely have software titles produced such universal acclaim as 'Halls of the Things' and 'The Dungeon Master'. Now, with three brand new programs, Crystal continues to set the standard of software excellence. The difference is obvious - the choice is yours:

The Best or The Rest.



HALLS OF THE THINGS

A stunning multi-level maze 'arcade - adventure'.

"Excellent and dangerously addictive - could change the Spectrum games scene overnight". ....Sinclair User.

"Spectacular - One of the best games I've seen, finely balanced between simplicity and addictiveness - superb graphics and colour - I CAN'T RECOMMEND IT HIGHLY ENOUGH". ....Popular Computing Weekly.

ZX Spectrum 48K **£7.50**
Written by Neil Mottershead, Simon Brattel and Martin Horsley.



THE ISLAND

The ultimate test of logic and deduction! Can you solve the hidden mysteries of the South Pacific Island on which you have been stranded - and escape alive! A brilliant classic style adventure game to facinate and frustrate you for, months!

ZX Spectrum 48K **£7.50**
Written by Martin H. Smith.



INVASION OF THE BODY SNATCHAS!

At last! a version as fast and furious and as frustratingly addictive as the arcade original. Landers, Mutants, Bombers, Pods, Swarmers and much much more combine to produce the ultimate space game!

ZX Spectrum 48K **£6.50**
Written by Simon Brattel and Neil Mottershead.



ROMMEL'S REVENGE

A brilliant interpretation of the most visually stunning arcade game of all time. Superb high resolution 3D graphics with full perspective plus a host of new and exciting features make Rommel's Revenge the most spectacular game ever produced for your Spectrum!

ZX Spectrum 48K **£6.50**
Written by Martin Horsley.



Please send SAE for our latest catalogue and details of our forthcoming software.
Catalogue FREE with every order. P&P included.
Please add £0.50 per item for overseas orders.
Please make cheques/PO's payable to:

CRYSTAL COMPUTING
Dept SU11
2 ASHTON WAY
EAST HERRINGTON
SUNDERLAND SR3 3RX

Please Supply:
Invasion of the Body Snatchas ☐
Rommel's Revenge ☐ The Island ☐
Halls of the Things ☐ The Dungeon Master ☐
Catalogue (please enclose SAE 6in. x 9in.) ☐

I enclose cheque/PO for...

NAME...

ADDRESS..

DEALERS! For details of our excellent dealer discounts (including export) ring Chris Clarke on 061-205 6603.

PROGRAMMERS! Written any good software? send it to us for evaluation and details of our excellent royalty scheme.

School becomes Spectrumised

Nicole Segre meets Canterbury schoolmaster Colin Dickinson, who is infatuated with Sinclair computers

AT THE END of every term, the 50 or so boarders at St Edmund's Junior School, Canterbury, Kent, take home for their parents' benefit a detailed printed statement of how much they have spent on telephone calls, sweets from the tuckshop, replacement of school property, stationery, stamps and other sundries, and how much remains in their pocket-money accounts.

At any time during the term, a print-out showing vital facts like who is where on weekend leave, how many meals are needed, the pupils' behaviour record, their examination results and their latest air pistol shooting scores is available at scarcely any notice.

It is all done on a Spectrum owned by Colin Dickinson, the St Edmund's Junior School boarding housemaster and also its mathematics and science teacher. His enthusiasm for his machine has resulted not only in the gradual computerisation of the administration of the school but in the recent arrival of 10 more Spectrums for the amusement and instruction of the 200 pupils.

Dickinson's infatuation with computers began when he first set eyes on a ZX-80 belonging to a colleague. It was at about that time that the ZX-81 appeared and he bought one immediately, putting himself on the Spectrum mail order list not long afterwards.

"The Spectrum broke down two days after it arrived," he recalls, "but I drove to Cambridge and insisted that it was replaced. That was done without a murmur and I have never looked back since."

Dickinson had to overcome his ignorance of programming, as well as the difficulties of loading and saving on a ZX-81 to write his first program, the boarders' pocket money accounting system. "I burned a good deal of midnight oil," he says, "and looking at it now, I can see that the structure of the program is a hideous mess — but it works. I once tried to tidy it but the results were not so good, so I decided to leave it alone."

The program shows what each boy has spent and also produces a balance statement for the bursar, as well as transferring messages for the house tutor; standard amounts for everyone can be entered and all sums are calculated automatically.

Since the first program, Dickinson has written a program which produces general listings of pupils by name, age, form, house, or what have you. Another works-out their three-weekly work grades and another sorts examination results into either alphabetical or rank order. There is a program to issue exit slips for pupils leaving the school premises and one to calculate bills for children using the school telephone.

A particularly useful program keeps track of the school "stars and stripes" scheme, a merit and demerit system by which 10 stars earn a Mars bar and six stripes mean a week's fatigue duties.

Perhaps best of all is the program which keeps a record of air pistol shooting scores, along with the position of pupils on the competitive ladder and the average of their five best scores, all calculated automatically.

Dickinson does not think the time he saves by using the computer has compensated for the time he has spent programming it — yet. "It would be much quicker than pencil and paper, as well as more accurate, if it were not for the delay in loading and saving," he says. To remedy that, he has ordered a Microdrive, which will mean that he can have a program ready to run in a few seconds.

Dickinson's equipment consists of a Spectrum built into a dK'tronics keyboard — he is adept with a soldering iron — an Abacus controller amplifier, built-in power supplies, and a newly-acquired Dean Electronics Timex printer, which he feels is a great improvement on the Sinclair one "although that is marvellous at the price."

For the school, he has managed to acquire one Spectrum with colour monitor and tape recorder with the help of funds from the Department of Industry Microcomputers in Primary Schools scheme; and another nine Spectrums with black and white monitors bought by "a rich and eccentric friend of mine."

The children, including the girls who have been attending the school as day pupils since last year, can use the ma-





chines in their spare time for games. "The boys tend to like the arcade games best and the girls seem to prefer the adventure games. Either way, it is a useful way to keep them out of mischief," he says.

From this term they will also be learning about programming, in groups working two to a machine for an hour a week. "Once they have all taken the initial compulsory course, intended to give them just a taste of what programming is, those who do not like it can drop out but I am hoping some will want to continue seriously," Dickinson says.

He sees other advantages in having computers for the children to use. One, he admits unashamedly, is that parents are attracted to any school able to teach their offspring computer skills. "It looks great on a prospectus," he says gleefully. He also feels that the Spectrum has a particularly useful role to fulfil in the classroom.

"Computers will never replace teachers," he says, "but they can be used to plan and monitor a course which uses a variety of resources — including old-fashioned books.

They can also be used to make practice and drill, or simple learning by rote, more stimulating than traditional methods."

The educational software available, he says, is scarcely inspiring. "It tends to be either too simple — counting buttons or trains, for instance — or it is badly-designed and presented, so that the children do not know what they are meant to be doing."

He has written two educational programs — one a multiplication tables test, the other a French vocabulary test complete with accents.

'One program keeps a record of air pistol shooting scores along with the position of pupils on the competitive ladder and the average of their five best scores'

He thinks the real way forward is for teachers to make software designers aware of their problems and provide new programs according to their needs.

Many children find it much easier to work with a computer than to have an adult looking over their shoulders, he says, and those with special problems find it specially valuable.

However primitive the state of the art, the Spectrum has already proved its worth in the classroom. "The single-entry keyboard has been much-criticised," says Dickinson, "but the children love it — especially those with reading and writing problems.

How much simpler to press a button than to have to spell it." The Spectrum syntax checking, which does not permit an incorrect line to be entered, is also helpful.

"One dyslexic child has improved considerably by being able to practise on the computer; and a particularly shy, quiet child has gained general respect by his unusual skill on a keyboard."

Dickinson's enthusiasm shows no sign of waning and even appears to have rubbed off on the children. Two former pupils are now busily programming on the senior school's two RML 380-Z machines and the junior school computer room, with its array of Spectrums, is scarcely ever empty.

University Software

LIBRARY OF ADVANCED MATH/STAT/ECON

TAPE 1: MATRIX OPERATIONS — **SPECTRUM £6.95, ZX81 £5.95**

Side A: Inversion, multiplication, addition, subtraction and scalar multiplication of matrices and vectors within one single program. Any output can in turn be used as the input of the next operation without re-typing. Capacity: 16K ZX81: 25 × 25, 16K Spectrum: 17 × 17, 48K Spectrum: 48 × 48.
Side B: Determinants of square matrices.

TAPE 2: POLYNOMIALS — **SPECTRUM £6.95, ZX81 £5.95**

Side A: Includes quadratic equations (as degree 2 polynomials) and Newton-Raphson and half-interval search methods for higher degree polynomials. Computes the roots with 8 digits of precision.
Side B: You can plot polynomials in any interval and examine their roots, extremum points.

TAPE 3: INTEGRATION — **SPECTRUM £6.95, ZX81 £5.95**

Side A: Integration of functions by Simpson's and trapezoidal rules. Also computes the area enclosed by two functions.
Side B: Plot of integrals. Integration can be visualised on the screen.

TAPE 4: REGRESSION — **SPECTRUM £7.95, ZX81 £6.95**

Side A: A highly developed multivariate regression program featuring Log/Ln option on each variable (thus allowing exponential and geometric regressions), R^2, corrected R^2, standard errors, t-statistics, F-statistics, degrees of freedom, Durbin-Watson statistic, interpolation. Capacity (no of variables × no of observations); 16K ZX81: 2 × 500, 5 × 250, 10 × 140, 16K Spectrum: 2 × 220, 5 × 100, 10 × 50, 48K Spectrum: 2 × 1800, 5 × 900, 10 × 500.
Side B: Plot of bivariate regressions. You can see how your computer draws a best-fitting line on a set of numbered data points.

TAPE 5(a): LINEAR PROGRAMMING — **SPECTRUM £7.95, ZX81 £6.95**

Side A: A user friendly optimisation program capable of handling all sorts of linear programming problems (any combination of <, =, >, constraints and $x_i >$, $x_i < 0$, $-\alpha < x_i < \alpha$ sign constraints). Features the cannonical equivalent of the primal, values of slack variables and the dual. Capacity (no of variables × no of constraints); 16K ZX81: 10 × 23, 15 × 20, 20 × 15, 16K Spectrum: 10 × 10, 48K Spectrum: 10 × 50, 25 × 40, 50 × 30.
Side B: Solutions of simultaneous equations.

TAPE 5(b): PROFESSIONAL LINEAR PROGRAMMING — **£14.95**

Available for 16K ZX81 and 48K Spectrum with above features plus 'save-data' and 'change-data' facilities. Any single data entry can be changed without re-typing the whole data.

- Cheques payable to:
  UNIVERSITY SOFTWARE
  29 St Peter's Street
  London N1 8J9
- All incl. prices for the UK.

Tapes 1 – 5(a) Spectrum £35
ZX81 £30

TELESOUND 84

(Patent Pending)

ZAP

SPECTRUM BEEP BOOSTER

. . . Puts Sound Through TV . . .

Probably the world's smallest sound modulator, measuring 2½ x 1½ x 1cm, TELESOUND 84 fits inside the ZX Spectrum and most other home computers to enable the BEEP to be heard directly from an unmodified TV. Sound can be controlled by the TV from a whisper to a roar. Fitting takes only minutes with three easy snap-on connections, eliminating soldering. Dealer enquiries welcome.

TELESOUND 84 costs £8.95 inclusive from Dept SU.

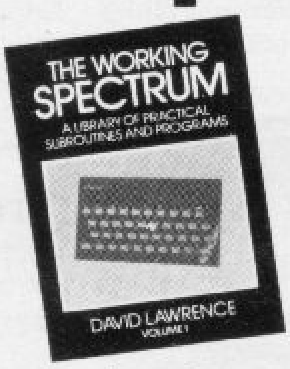
COMPUSOUND

32 Langley Close, Redditch
Worcs B98 0ET

The best books for the Spectrum

SUNSHINE







Spectrum Adventures
A major work by Tony Bridge and Roy Carnell detailing the growth and development of Adventure Gaming.
ISBN: 0 946408 07 6

The Working Spectrum
A library of practical subroutines and programs by David Lawrence.
ISBN: 0 946408 00 9

Spectrum Machine Code Applications
David Laine explains a collection of practical machine code routines.
ISBN: 0 946408 17 3

Look out for the Sunshine range in W.H. Smith's, Boots, John Menzies, other leading retail chains and through our national network of book shops and specialist stores.

Dealer enquiries:
01-734 3454.

Sunshine Spectrum Software

* Cruising — 16K RAM
* Androids — 16K RAM
* Blind Alley — 16K RAM
* Sword Fight — 16K RAM
* Galaxy Attack — 48K RAM

Please send me
- ☐ The Working Spectrum at £5.95 each
- ☐ Spectrum Adventures at £5.95 each
- ☐ Spectrum Machine Code Applications at £6.95 each
- ☐ Cruising at £4.95 each
- ☐ Blind Alley at £4.95 each
- ☐ Androids at £5.95 each
- ☐ Swordfight at £5.95 each
- ☐ Galaxy Attack at £5.95 each

I enclose a cheque/postal order for £______ made payable to Sunshine Books, 12/13 Little Newport St., London WC2R 3LD

Name __________
Address __________

Signature __________

We can normally deliver in 4/5 days.

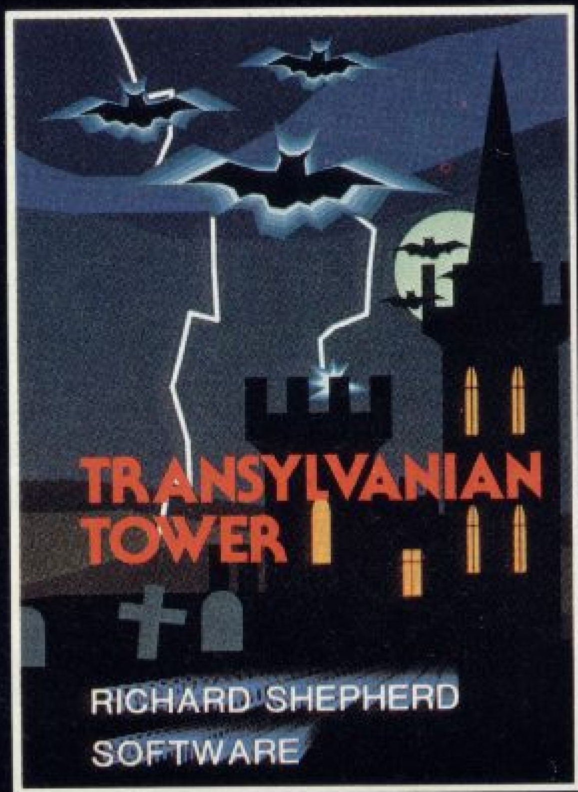
"ADVENTURES INT

AVAILABLE FROM W.H. SMITH
AND ALL LEADINGCO

Transylvanian Tower

A spine chilling adventure... enter via the dungeons... navigate your way through 500 3-D rooms... survive the swooping vampire bats ... reach the terrifying top... confront and kill Count Kreepie, ridding the world of this Transylvanian Terror.

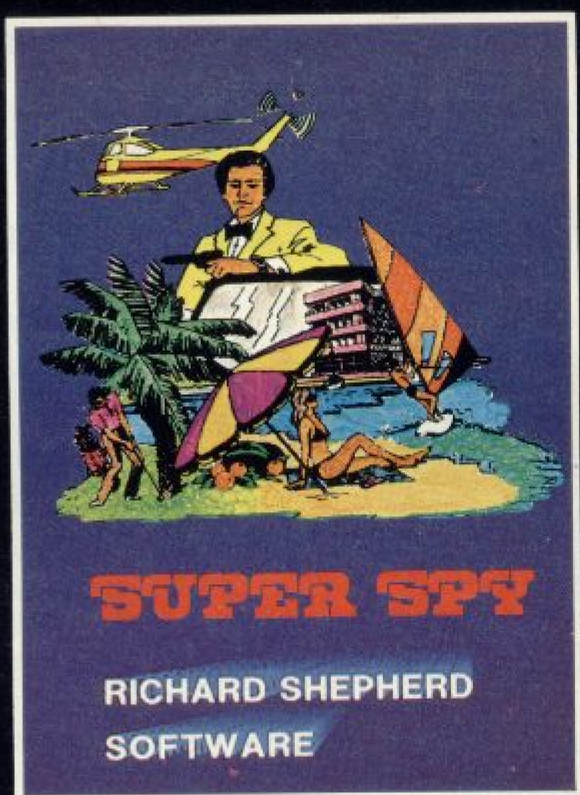
Can you survive the Top of the Tower? Full save routine for use during the hours of darkness! 48K Spectrum **£6.50**

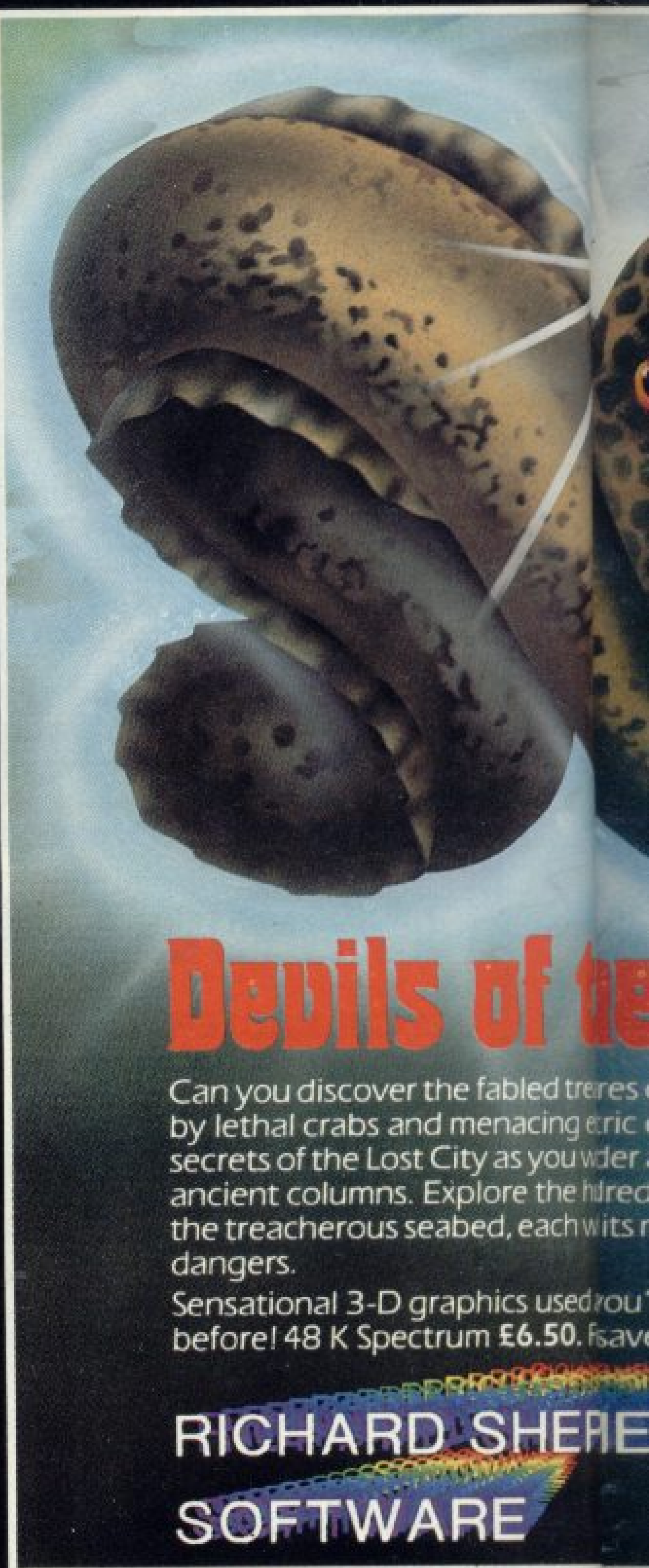


Super Spy

Locate the secret island hideaway of the mysterious meglomaniac Dr. Death. Follow his trail across continents, through complex puzzles and 3-D mazes. Discover the entrance to his underground lair — but beware — even with your death-defying gadgets his evil henchmen may still win the day!

With save routine for part time secret agents! 48K Spectrum **£6.50**





DEALERS — GENEROUS DISCOUNTS AVAILABLE CONAC

RICHARD SHEPHERD SOFTWARE

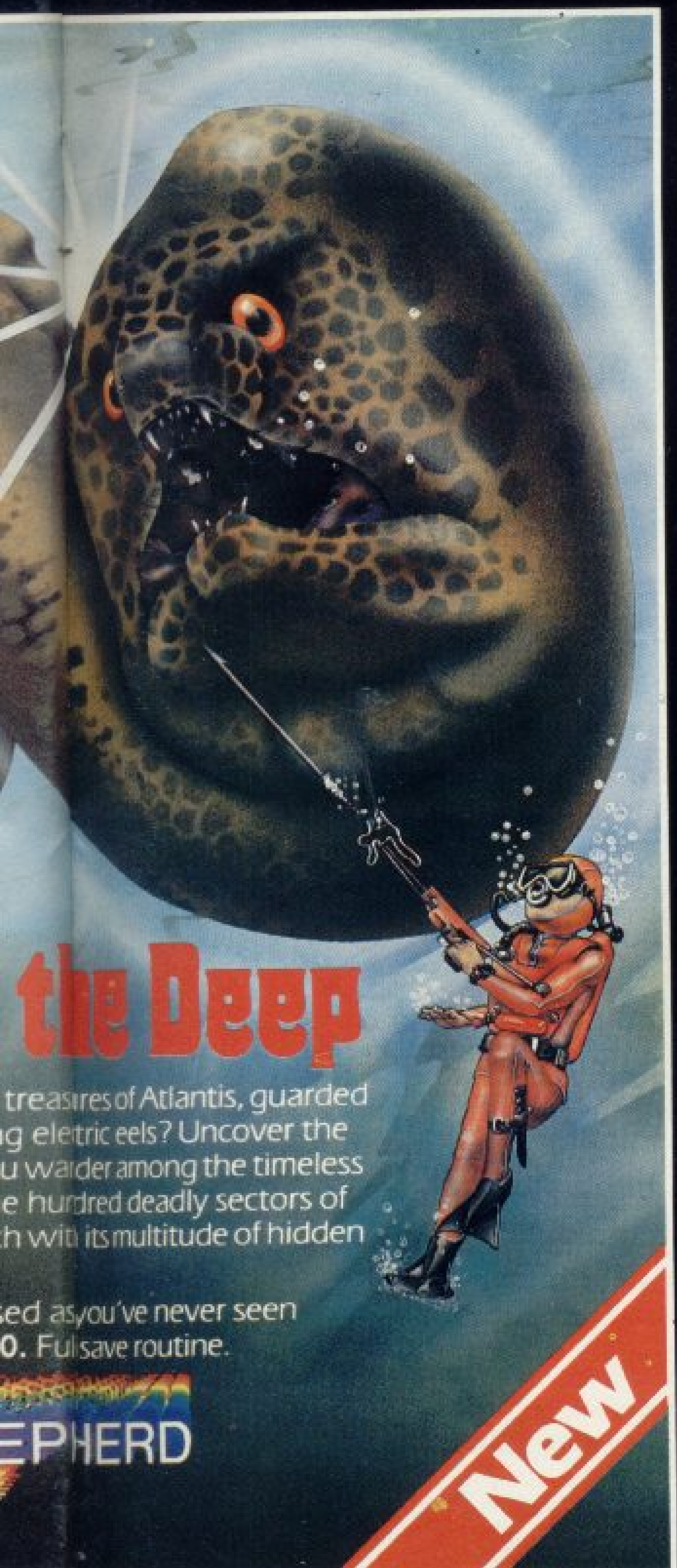
ELM HOUSE, 23-25 ELMSHOTT LANE, CIPPENHAM, SLOUGH, BERKSHIRE.

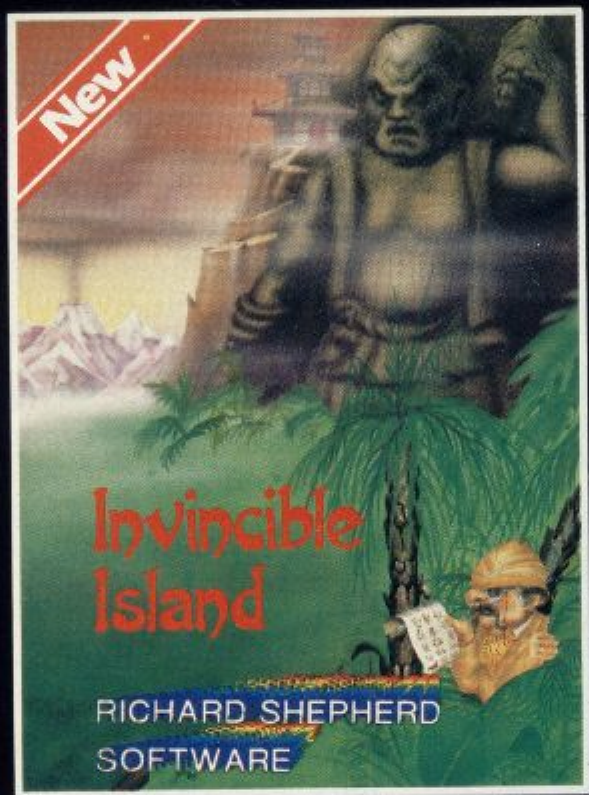
CREDIT CD H
RING (086)
FOR EXPRS S

NTO IMAGINATION"

MITH, JOHN MENZIES, BOOTS*

NG COMPUTER STORES

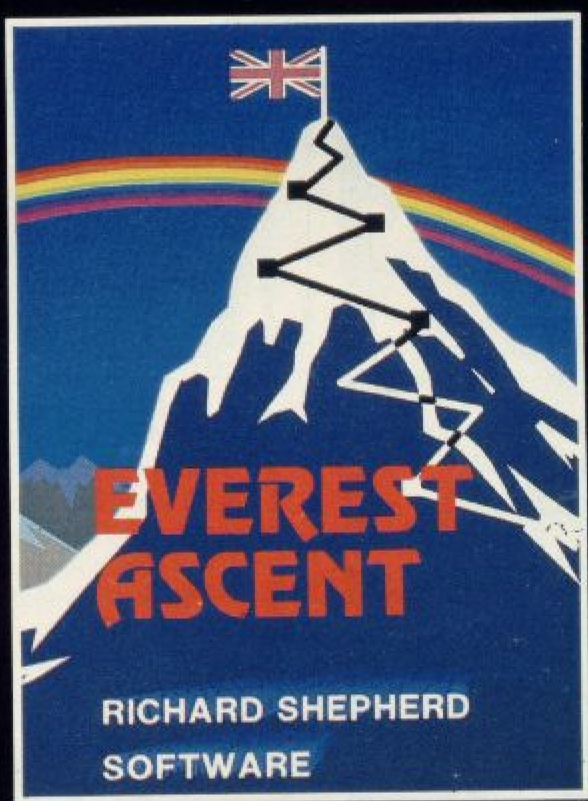




Invincible Island
by Peter Cooke

Exhaust your ingenuity in the quest to find The Seven Parchments of Xaro and their meaning! Will they lead you to undreamt of treasures or eternal doom? Explore the mysteries of the stockade and puzzle within the Pagoda! A spectacular split screen graphic and text adventure to braintease you for weeks!

Adventurous graphics for every location. Save routine. 48K Spectrum **£6.50.**



Everest Ascent

Stake your claim to the top of the world in this strategic vertical adventure. Conquer the summit of the world's highest peak! . . . struggle from base camp to base camp . . . survive the elements . . . watch out for avalanches, thin ice and wayward sherpas . . . encounter abominable snowmen and cross bottomless crevasses!

A game of skill, strategy and planning — a graphic simulation of man's ultimate endeavour! Save routine. 48K Spectrum **£6.50.**

ONTACT JOHN SALTHOUSE ON (06286) 63531 FOR DETAILS

T CARD HOTLINE
G (06286) 63531
EXPRESS SERVICE

RICHARD SHEPHERD SOFTWARE

ELM HOUSE, 23-25 ELMSHOTT LANE, CIPPENHAM, SLOUGH, BERKSHIRE.

* Selected titles available at larger branches

The Galaxy's FIRST ever computer comic!

Zooming into touchdown at W H Smiths, John Menzies and other good newsagents now and every fortnight . . . only 40p.

Order your copy TODAY!

Bursting with great new comic strips . . . exciting stories . . . astounding facts . . . big prizes . . . competitions . . . fascinating quizzes . . . star personalities. And that's just the start of Britain's newest, brightest, most fun-packed comic ever!

LOAD RUNNER

It's the only comic for the age of the computer – it puts the rest back with the dinosaurs!

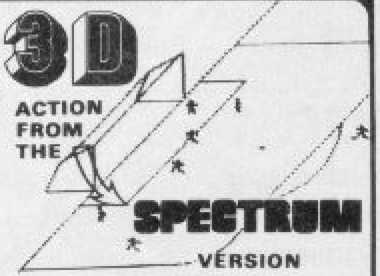


NOW IN YOUR HIGH STREET SHOPS

FOOTBALL MANAGER 3D

by Addictive Games

for **SPECTRUM 48K AND ZX81 16K**



This superb game is **now available** from branches of

W.H. SMITH * and BOOTS.

Manage your own team in this exciting game of skill which vividly captures the drama and excitement of real football.

FEATURES INCLUDE:
★ 4 DIVISIONS ★ F.A. CUP ★ PROMOTION & RELEGATION ★
★ TRANSFER MARKET ★ TEAM SELECTION ★
★ SAVE GAME FACILITY ★★★ *AND MUCH MORE!* ★★★

WHAT THE PRESS SAY ABOUT IT:—

IF YOU have always wanted to manage a football team, **FOOTBALL MANAGER,** *from Addictive Games, is for you — The game is ideal for a football fanatic but the most interesting thing for us was the 3-D graphics used to create the goalmouth action — the game is a winner.*
SINCLAIR USER FEBRUARY 1983

Although I'm no great football fan, I really enjoyed playing this game — excellent use is made of colour and user-defined graphics. The game is very logically put together, so that the development of strategy and tactics has a real effect. For example, one of my teams got through to the fourth round of the F.A. Cup where it was beaten by a second division side. This upset morale and meant that our promotion bid failed. Perhaps I should have given up the F.A. Cup run and held some good players back — the possibilities are endless. Brian Clough had better watch out!
ZX COMPUTING FEB/MARCH 1983

* SPECTRUM VERSION ONLY.

ALSO AVAILABLE FROM THE FOLLOWING SHOPS
BUFFER MICRO SHOP (London)
MICROWARE (Leicester)
ANIROG COMPUTERS (Horley, Surrey)
SUCCESS SERVICES (Walsall)
THE COMPUTER SHOP (Newcastle)
DRAGON BYTE (Leeds)
AND OTHER GOOD COMPUTER SHOPS

PRICES
FOR THE SPECTRUM 48K £6.95, ZX81 16K £5.95
3D GRAPHICS ONLY IN SPECTRUM VERSION
To Order send Cheque P.O. payable to
ADDICTIVE GAMES Dept SU P.O. Box 278
Conniburrow, Milton Keynes MK14 7NE
PLEASE STATE COMPUTER

A MUST FOR ANYONE INTERESTED IN ZX MACHINE CODE!



The finest range of utility programs for ZX Computers. Used by professionals. Very useful for beginners

ZX SPECTRUM MACHINE CODE SYSTEM
(The key to machine code success)

SPECTRUM EDITOR/ASSEMBLER A powerful and essential machine code programming aid. 16K and 48K on same cassette + full documentation. Major features: EDITOR with Auto line number and renumber, 40 column screen display, tabulated into fields for easy reading; 5 character label names, easy line editing and cursor control; SAVE/LOAD/VERIFY routines, output to ZX PRINTER. TWO PASS ASSEMBLER accepts all Z80 mnemonics, decimal or hex numbers, simple arithmetic on operands. Assembler Directives — ORG, END, DEFB, DEFW, DEFS, DEFL, EQU, DEFM. **ONLY £8.50**

SPECTRUM MONITOR Machine Code Debug/Disassembler Enter, Run, Debug M/C programs. Compatible with BASIC. Breakpoints and Registers Display. Disassembler to screen or ZX PRINTER. 16K and 48K on one cassette + 30 page manual. **ONLY £7.50**

ZX81 UTILITIES
(For everyone . . . beginner to professional)

ZX81 REMLOAD Machine Code Debug/Monitor Explore and master machine code. Compatible with BASIC. CREATE A REM line — any length. BREAKPOINTS & REGISTERS DISPLAY. Fully documented 30 page manual and cassette. **ONLY £6.95** 16K to 64K

ZX81 ZX-MC Machine Code Debug/Monitor The professional one! ENTER/RUN/DEBUG M/C programs. SAVE/LOAD/VERIFY at double speed. BREAKPOINTS & REGISTERS DISPLAY. Self-contained machine code — cannot be used with BASIC. 36 page manual and cassette. **ONLY £7.50** 4K to 64K

ZX81 SCREEN KIT 1 More screen power in your BASIC programs! BORDERS — any size anywhere on screen. SCROLL in 4 directions. CLEAR and REVERSE part of the screen. FLASHING CURSOR anywhere on screen — simulates INPUT. DATA FILES SAVE/LOAD BASIC variables — Double speed. 880 Bytes machine code for instant response. Becomes part of your BASIC program. **ONLY £5.70** 4K to 64K

SEND CHEQUE/P.O. FOR FAST MAIL ORDER!
S.A.E. for full details.
6 Corkscrew Hill, West Wickham, Kent BR4 9BB

*All prices include VAT & P&P

PICTURESQUE
PICTURESQUE
PICTURESQUE
PICTURESQUE

Spectrum Software available from: Buffer Micro Streatham. Microware Leicester. Educational suppliers: Griffin & George.

WE HAVE SOUND . . . COLOUR . . . ACTION . . .
. . . WE HAVE R&R SOFTWARE



Whether you have an Oric, Spectrum or ZX81 you can play golf in the comfort of your home.

ZX81 16K (Not illustrated) All the excitement of the professional circuit. For 1 or 2 players. You can select either 9 or 18 hole course. Try and overcome obstacles such as trees, bunkers, water – even the rough can be tricky! Full on screen instructions. ONLY £3.75

Spectrum Golf 16K Similar to ZX81 Golf but utilizing the Spectrum colour graphics and sound. ONLY £3.75

Oric Golf 48K A Further development of Spectrum Golf utilizing 48K of memory and the excellent Oric graphics. For 1 to 6 players. ONLY £7.95

If golf isn't your game try the other games in our range.

FOR SPECTRUM

Star Trek 48K See if you can rid the galaxy of the evil Klingons, save the Federation from the treacherous Romulans, race to protect your star-bases from attack. Are you star-ship commander material? ONLY £4.95

Spectipede 16K See how long you can keep the Spectipede at bay as they decend upon you. You'll have the help of poison mushrooms and your gun which both kill the Spectipedes but look out for the spider – he will try to jump on you. For 1 or 2 players. Operates with most leading Joysticks or the Keyboard. ONLY £4.95

Gnasher 16K The ultimate maze game. Eat the dots but look out for the ghosts they could eat you! If you eat an energy pill you can eat the ghost. Full colour graphics and sound. Operates with most leading Joysticks or the Keyboard.

NEW FOR THE ORIC

Oric Quizzmaster 48K A menue driven quiz game utilizing sound and colour. Instructions are also given to substitute your own questions and answers. Great fun for all the family and ideal for education i.e. revision.
Quizzmaster 1 – General knowledge, sports and pastimes.
Quizzmaster 2 – General knowledge, rock and pop.
Quizzmaster 3 – Out soon.
ONLY £7.95 each which includes a £2.00 discount voucher for your next Quizzmaster.

Further Quizzmasters to follow.

R&R SOFTWARE
34 Bourton Road, Tuffley, Gloucester, GL4 0LE
Tel: (0452) 502819

SPECTRUM GOLF available from WHSMITH

ORWIN SOFTWARE: ZX81 & SPECTRUM
SUPER SOFTWARE AT LOW PRICES

"Michael Orwin has built a reputation for value-for-money software and his Cassette 4 offers quantity as well as quality."
Sinclair User, October '82

"If each game was on a separate tape and selling for £5 each I would still recommend them. But all on one for £5 . . . ! This sort of value for money just has not been seen before on any personal computer."

"Without sounding pushy I would like to conclude this review by saying — if you have a ZX-81 and like games, then you should buy Michael Orwin's cassette 4."

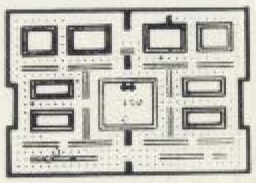
2 extracts from *ZX Computing*, Oct/Nov '82

"Eight games, including an excellent version of the Scramble arcade game . . . Easy to operate, graphically impressive and good value for money."

The Times, Saturday 11th December 1982 (about Cassette 4)

NEW! FOR 16K SPECTRUM
(will also run on 48K Spectrum)

CASSETTE A **Ten programs for £6**



GHOST GOBBLER Eat the ghosts before the ghosts eat you. Eat a star and you can chase the ghosts for a while.

ALIENKILL Control lasers, rockets and a force-field to stop the aliens from landing.
MOUSETRAP Trap the mouse in the corner but not anywhere else.
REVERSI A game of skill with simple rules but sophisticated tactics. Play against the computer.
LASER DEFENCE Control the laser sight to shoot down the alien ships. Machine code sound routines.

TANK BATTLE For 2 players simultaneously or play against the computer. Each player has 2 rotate controls and move and fire controls. The tanks fire steerable missiles.
PHOEBUS A puzzle.
BLACKSPOT Gobble the stars and avoid running into black spots created by crossing your own path.
CUBE Manipulate a cube any size from 2×2×2 to 7×7×7.
MINEFIELD Collect the crowns while avoiding the mines and the electrified fence.

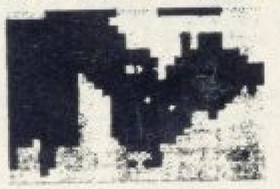
plus an extra . . .

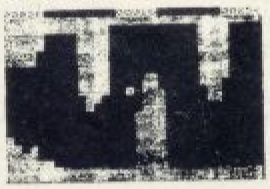
GRAPHIC DEMO Did you know your Spectrum could do all this!?

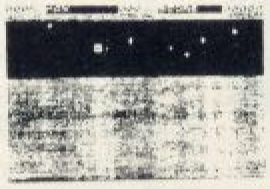
CASSETTE 1, eleven programs (including 7 in machine code) for 1K ZX81 **£3.80**	**CASSETTE 2**, ten games in Basic for 16K ZX81 **£5**	**CASSETTE 3**, eight programs (including 1 in machine code) for 16K ZX81 **£5**

CASSETTE 4 **8 games for 16k ZX81 £6**

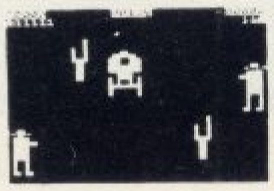
ZX-SCRAMBLE (machine code) with 3 stages.
Bomb and shoot your way through the fortified caves.



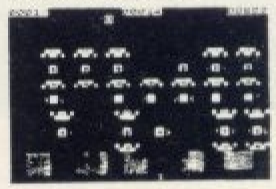


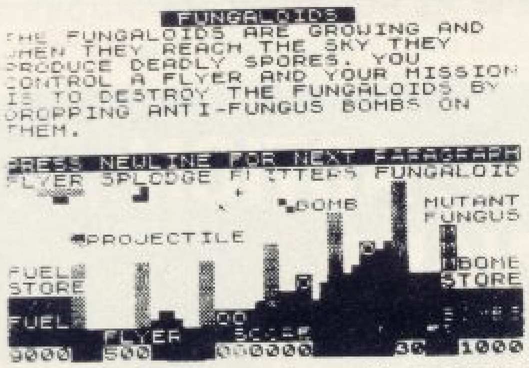


GUNFIGHT (machine code)



INVADERS (machine code)





GALAXY INVADERS (machine code)
Fleets of swooping and diving alien craft to fight off.

SNAKEBITE (machine code)
Eat the snake before it eats you. Variable speed. (very fast at top speed).

LIFE (machine code)
A ZX81 version of the well known game.

3D TIC-TAC-TOE (Basic)
Played on a 4×4×4 board, this is a game for the brain. It is very hard to beat the computer at it.

7 of the 8 games are in machine code, because this is much faster than Basic. (Some of these games were previously available form J. Steadman).

CASSETTE 5 **8 games for 16k ZX81 £6**

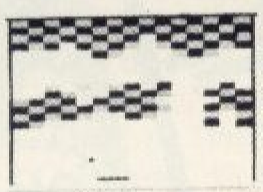
BYTE-MAN (machine code)
(previously available from Mindseye)



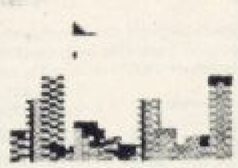
SPACE RESCUE (machine code)
(previously available from Mindseye)



BREAKOUT (machine code)



BLITZ (machine code)



PLANETOIDS (machine code)
Rotate, move, fire and hyperspace controls. Wide range of choice of speed and difficulty.

DODGEMS (machine code)
Dodge the computer's car while eating the dots.

DRAUGHTS (machine code)
Three skill levels.

MERCHANT (Basic)
Make your fortune on trading voyages in the Mediterranean and beyond.

7 of the 8 games are in machine code because it is much faster than Basic.

Please make cheques payable to ORWIN SOFTWARE.
ORWIN SOFTWARE, Dept. OSU, 26 Brownlow Road, Willesden, London NW10 9QL.
ZX81 & SPECTRUM SOFTWARE WANTED

·ZX81 + ·ZX SPECTRUM· ·SOFTWARE··BOOKS·

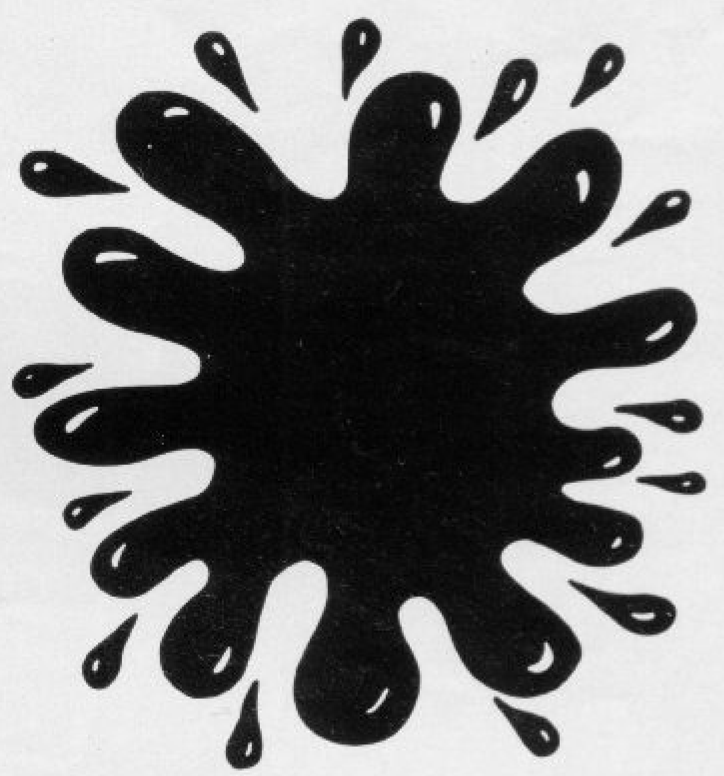
also BBC Micro

Cambridge Computer Store

1 Emmanuel Street
Cambridge CB1 1NE
Telephone (0223) 358264/65334
(closed 12.30 – 1.15 except Saturday)

£500 HI-SCORE PRIZE

SPLAT!



SPLAT AN ORIGINAL 48K ZX SPECTRUM CHALLENGE BY THE AUTHOR OF MINED-OUT. OBJECTIVES: EXPLORATION, SURVIVAL AND EATING GRASS!! Zippy, Plums, Rivers, A massive 21K play area, 7 levels to explore. User defined controls, also Kempston & A.G.F. joystick compatible, £500.00 High Score Competition. **SPLAT** evolution by Ian Andrew & Ian Morgan. Also available from all good computer shops.

ATTENTION PROGRAMMERS
TOP ROYALTIES PAID. ORIGINAL PROGRAMMES WANTED FOR ALL MAKES OF POPULAR HOME COMPUTERS.

Please send me . . . . copies of SPLAT at £5.50 inclusive 1st Class Post.

I enclose cheque/P.O. for £ . . . . or please debit my Access Card No.

Name . . . .

Address . . . .

ISL **INCENTIVE SOFTWARE LTD**
54 LONDON STREET · READING (0734) 591678

BRIDGE SOFTWARE

THE NIGHT SKY

(for Sinclair Spectrum 16k)

An observer's guide to the stars visible from the UK (48 to 58 North)

Discover the fascination of the limitless heavens.

Create brilliant hi-res starcharts with THE NIGHT SKY and your Spectrum

- Features over 700 different stars
- 5 magnitudes distinguished
- 50 constellations identifiable
- Over 4 million different skyscapes
- Sky colour indicates day, night or twilight
- Ideal for serious astronomers and novices alike
- Make your TV screen a mini planetarium

Trace the movements of the constellations minute by minute, night by night

Send £8.90 for cassette and Manual

Send s.a.e. for full list of our scientific educational, graphics and games software for Spectrum, ZX81, BBC and VIC-20

Full money back guarantee.

Trade enquiries welcome

BRIDGE SOFTWARE **Dept SU, 36 Fernwood, Marple Bridge, Stockport, Cheshire, SK6 5BE, England.**



The all-time best-selling arcade game for the 48K Spectrum

* Amazingly fast arcade action! Includes: * Training Mode and * Unique Customising Feature. The fastest and most exciting game for your 48K Spectrum.

"Melbourne House is fast gaining a reputation for classy products, and this is no exception. Penetrator is unique in its customisation features and will astound those who like to sneer at arcade-style games played on home computers."

PERSONAL COMPUTER WORLD

Penetrator is written entirely in machine language and takes up almost all of the 48K memory. If you have a 48K Spectrum, then you must have Penetrator!

Orders to: Melbourne House, 131 Trafalgar Road, Greenwich, London SE10

Correspondence to:
Melbourne House, Tring, Hertfordshire

All Melbourne House cassette software is unconditionally guaranteed against malfunction.

Trade enquiries welcome.

☐ Please send me your free 48 page catalogue.

Please send me:

48K SPECTRUM Cassettes

☐ The Hobbit	£14.95
☐ Penetrator	£6.95
☐ Terror-Daktil 4D	£6.95
☐ Melbourne Draw	£8.95
☐ H.U.R.G.	£14.95
☐ Computer Bridge	£8.95
☐ Abersoft Forth	£14.95
	£ ......
Please add 80p for post and pack	£ ... .80
TOTAL	£ ......

SU11C

I enclose my ☐ cheque ☐ money order for £ ....

Please debit my Access card No. ....

....

Expiry Date ....

Signature ....

Name ....

Address ....

....

.... Postcode ....

Access orders can be telephoned through on our 24-hour ansafone (01) 858 7397.

MELBOURNE HOUSE

John Gilbert continues his series on an alternative language by considering one of the most important and fundamental concepts

The decision of the Editor must be final

THE FORTH EDITOR is one of the most important and fundamental concepts in the language. Using it you will be able to enter, amend and delete parts of Forth programs, which you will remember are called words.

The Editor and the screens on which it operates are important, as they will allow you to keep a record of words which have been entered into the system. As we detailed last month, when a word is compiled into the Forth dictionary the constituent parts of that word are lost. You can no longer see the listing or how the word was constructed.

For instance, last month I defined a word which found the number of bytes which are left free in the computer memory. That was accomplished with the statements shown in figure one. From that figure you can see how the word was created but as soon as you enter it into the dictionary the statement is lost.

A permanent record of a word can,

> 'When a word is compiled into Forth the constituent parts of that word are lost'

however, be kept in one of the sections of memory which are designated as screens. Those screens will list a program just as you are able to list a program in Sinclair Basic. That is called the source, or text, listing.

Abersoft Forth can store up to 12 screens of words. They are numbered from zero to 11. Each of those screens takes 1,024 bytes of RAM and is structured as 16 lines with a potential of 64 characters on a line. That has nothing to do with the lines on the screen of the Spectrum or, if you are using it, the ZX-81, but it is just a method of dividing sections of memory in the machine.

The screens take 11K of RAM and, because of the speed at which information can be accessed by the Forth system, Abersoft has called this memory the RAM disc. When you first enter the Forth compiler you should type

DISC—INIT

to clear the disc and leave the RAM ready for new input.

You should then type

EDITOR

to invoke the commands for the source input and line manipulation. To select the screen page which you want to use, type the page number and CLEAR. In this case we shall use page one.

1 CLEAR

Then list that page by typing 'L'. You will see a heading at the top of the page which will indicate that you have accessed the correct screen. You will then see a list of numbers running down the left-hand side of the page.

It is best to start putting your word definitions on page one as page zero is reserved for comments about your pro-



gram code. That means you can document your Forth words on that page and the explanations can be accessed by typing

0 LIST

If you want to remove all the source from that or any screen type

0 CLEAR

where '0' is the number of the page.

To put textual comments on page zero or any other screen you should type the line number, followed by the letter 'P' and then the remark. That type of statement will operate in the same way as REMark in Sinclair Basic—in other words it will have no effect on the running of a Forth program.

Just as screen zero can be used for comments, so can line zero of every screen page. That means you can put a title on a page of words. That is done in the same way as it was for screen zero:

1 P THIS IS THE TITLE

To put a word definition on to the screen you must select your page, which is one in this case, and develop the word definition using the colon (:) to start and the semi-colon (;) to finish in the usual way. The only difference is that you have to add a line number to the beginning of the text.

To put the BYTES FREE definition on to screen one you would type

1: BYTESS ." NUMBER OF
BYTES FREE= " FREE .;

If you have any extra code you could put it on to other lines of the screen, although 64 characters on a line should be sufficient for most purposes.

You can put several words on one screen. All you have to do is to indicate to the computer that the text you are entering is a definition by using the colon at the beginning of the word.

After you have entered the definition you may want to save it as a source listing before you compile it into the Forth dictionary. To do so you must save the whole disc file on to tape, using the SAVE command. To check that the file has been saved correctly most Forth packages have a VERIFY command. All you have to do is wind back the tape to the beginning of the file and replay it into the computer. If you have any problems with the VERIFY routine or crash back into Basic, refer to your language system manual to see how to recover with a 'warm start'. That will leave your disc file intact and you can re-SAVE.

When you have SAVEd the disc source code you can safety compile the original, which is still in memory. To do so type the colon which puts the computer into compile mode. That will compile all the words which are contained on the disc. If you want to compile a selected word you should type the colon, followed by the name of the word.

To check that the definition has been compiled correctly VLIST the present dictionary. Your new definition should be the first on the list.

Try running your new BYTES word. If it does not work, you have the source listing on tape which you can alter and compile again. Just LOADT the relevant disc into memory and type the number of the page on which you put the word definition, followed by the usual space and the command LOAD.

You will then have the relevant page in memory and all you have to do is LIST it and make your alterations by invoking the EDITOR for your particular system.

The Forth Editor provides some complex commands which will operate on screen lines and words. Some versions of Forth may have have slightly different commands, so you should refer to your manual before making alterations.

When you can save words on to disc and recall them you can develop your own programs. To give an introduction to the more complex applications with which I will deal next time the following program will show what can be done with one Forth word.

You may have noticed when looking through the main dictionary that few mathematical functions are included. One of the reasons is that Forth is adaptable and, unlike many versions of Basic, you can define your keyword definitions.

In mathematical circles the function for finding the square of a number is important and therefore useful to have in your Forth dictionary. This word definition will put it in there for you:

:SQUARE DUP DUP * ;

You may wonder what that strange word DUP is in the definition. It is a word which I have not yet dealt with and means double. The action of DUP puts a specified value on the Forth stack and then generates a duplicate of that number which is put on the stack on top of the first value. You can see the action of this word by typing:

4 DUP .

in immediate mode.

Now you can understand how DUP works you should be able to see how the definition SQUARE operates. It puts four copies of the specified number on to the stack and then it does the multiplication using those values. The result will be the square of the original number followed by that root number. For instance, if you typed

100 SQUARE

you should finish with the computer output

100 100 ok

You could produce word definitions which will give you a full set of mathematical functions and even give those new words the names of the keywords which provide the same functions in Basic. For instance, you could call the square root word SQR and use COS for cosine.

'You could produce definitions which give a set of mathematical functions and even give those words the names of the same Basic keywords'

You should appreciate, however, that although the names are the same, their arguments or the numbers on which they operate will be before the words and not after.

A few simple Forth words have enabled us to provide Basic mathematical functions in Forth. This is the least of what can be done, as you will see when I examine graphics commands for Abersoft and Artic packages next month.

```
: BYTES ." NUMBER OF BYTES
FREE= " FREE . ;
```

Figure 1.
Word definition of BYTES

```
INIT-DISC

EDITOR

1 CLEAR

0 P TITLE OF WORD

1 : BYTES ." NUMBER OF BYTES
FREE= " FREE . ;

SAVET

VERIFY

:
```

Figure 2.
Step-by-step entry of a word on to a screen.



Now you're talking,
Spectrum!
CURRAH
μSPEECH
μ SPEECH AND SPECTRUM SOUND FROM YOUR TV
μ INFINITE VOCABULARY
μ INTONATION TO ADD CHARACTER
μ INTEGRAL USER-FRIENDLY SOFTWARE DRIVEN BY CUSTOM GATE ARRAY
μ EASY TO USE: LET S$= "HE(LL)(OO)" WILL SAY "HELLO"
μ PLUS EXCITING GAMES AND SPEECHWARE FROM LEADING SOFTWARE HOUSES
Adding a new dimension with
CURRAH μSPEECH

At last, the first joystick that puts the firing button where it should have been in the first place.



TRIGA COMMAND IS HERE!

The Top American Joystick is now available in the U.K. . . .

To fit your **SPECTRUM**

ONLY **£19.99** *+ £1.50 P+P*

- *Including Interface to plug straight into the Spectrum.*
- *The first Joystick to give you "Arcade" feel and control.*
- *"Jet Style" heavy duty, diamond cut grip.*
- *Fire Trigger placed under your index finger . . . the finger with the fastest reflex action.*
- *Self centreing, 360° action.*
- *Compatible with most of the latest Software including:*

Jetpack	*Slippery Sid*	*Brain Damage*	*Frogger*
Cookie	*SS Enterprise*	*Last Sunset*	*Blind Alley*
PSSST	*Nite Flite*	*Mazeman*	*Galactic*
Timegate	*Meteoroids*	*Galaxians*	*Jailbreak*
3D Tunnel	*Gulpman*	*ETX*	*Transam*
Cosmos	*Cosmic Guerilla*	*Frenzy*	*Robotics*
Cyber Rats	*Kong*	*Astroblaster*	*Armageddon*
Galaxians	*Armageddon*	*Knot in 3D*	*Exterminator*
Spookyman	*Mission Impossible*	*Joust*	*Detective*

NOTE: THIS IS ONLY A SMALL SELECTION OF THE MANY COMPATIBLE GAMES

*** Also available for Commodore/Atari**

Item	Amount
Spectrum Trigga Command	£19.99
VIC/CBM 64 Trigga Command	£12.99
Atari Trigga Command	£12.99
Interface Unit only*	£11.99
* To use with your own Joysticks with Spectrum	
P+P	£ 1.50

ALLOW 7 DAYS

TRADE ENQUIRIES WELCOME

24 HRS CREDIT CARD LINE

Access — Barclaycard VISA

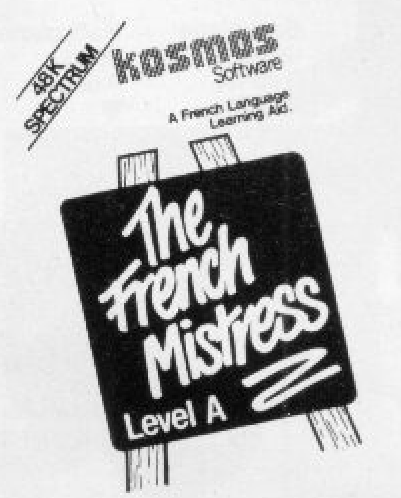
DATEL ELECTRONICS

27 HOPE STREET, HANLEY, STOKE-ON-TRENT

TEL: 0782 273815

Regardez!

NEW SPECTRUM VERSION



- ★ Pupils
- ★ Teachers
- ★ Travellers
- ★ Students
- ★ Graduates
- ★ Linguists
- ★ In fact anyone having an interest in French will benefit from this unique language learning aid

★ Available for
BBC model B
SPECTRUM 48K

★ Ready made lessons provide an enormous vocabulary of words, phrases and verbs arranged in subject groups.

★ Lessons can be run in three ways; learning, self-test or speed and accuracy test.

★ Lesson displays include all French accents; different colours for masculine and feminine words.

★ Full tape editing facilities allow an infinite number of new or updated lessons to be created and stored for later use.

Choice of Level A or B cassettes with totally different vocabularies. **£9.95** each (P&P inc.) Both cassettes include extensive word lists; verbs and phrases are introduced in Level B. Available from dealers or mail order. State BBC or Spectrum. **COMING SOON!** "The German Master", "The Spanish Tutor"

kosmos
SOFTWARE
Unit A,
1 Pilgrims Close, Harlington,
Dunstable, Beds. LU5 6LX
Tel: 05255 3942

NOW 2ND GREAT YEAR!

HIRE

ZX81/SPECTRUM

PROGRAM TAPES

JOIN OVER 2,000 DELIGHTED MEMBERS!

ADVENTURE GAMES
ARCADE and SIMULATION GAMES
BUSINESS and PRACTICAL PROGRAMS
UTILITIES
M/C COMPILERS
EDUCATIONAL
AND MORE!

FREE ILLUSTRATED QUARTERLY MAGAZINE WITH TIPS, NEWS, REVIEWS DISCOUNT OFFERS PLUS OUR TOP 40 TAPES CHART BASED ON THOUSANDS OF SCORES!

UP TO 2 WEEKS FOR ONLY £1·20 INCL. FIRST CLASS POST and VAT!

CHOOSE FROM TAPES BY 40 TOP SUPPLIERS ALL WITH PERMISSION!

YOUR FIRST TAPE FREE BY RETURN IF YOU JOIN WITHOUT DELAY USING THIS SPECIAL COUPON!

THE ORIGINAL SINCLAIR LIBRARY!

TO: SINCLAIR OWNERS' SOFTWARE LIBRARY, Warren Road, Liss, Hants GU33 7DD.

NAME

ADDRESS

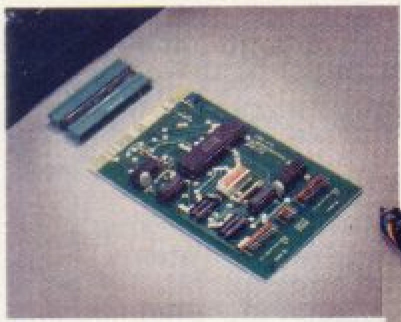
MACHINE

MAIN INTEREST (for free tape)

Enclose £9.50 for year's membership (Spectrum) or £7.50 (ZX81); overseas (Europe only) + £2 unless with local branch.

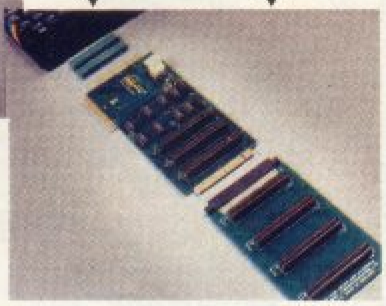
Overseas branches: **Benelux:** Jacobsmitslaan 75, B-2400 MOL Belgium (mem. fee 44 & 49 Guilders/790 & 890 Bfr). **Eire:** Softenk, 120 South Circular Rd, Dublin 8 (£12.50 punt). **South Africa:** P.O. Box 1769 Manzini, Swaziland

SU



▲ Any single extension card

Backplane up to 3 cards ▼ + Backplane up to 4 cards ▼



= 7 ▶ cards



ZX Spectrum expansion...
...start with one card...
extend up to seven cards!

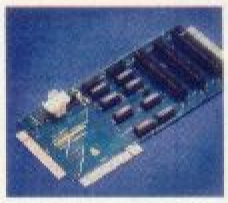
The price/computer power ratio of the Spectrum is tremendous but up to now its lacked one major thing compared with other Z80, 48K computers costing many times more – expandability.

U-Microcomputers have been the UK leaders in Apple Expansion cards but with the Spectrum we've had to provide the means to expansion (3 and 4 slot backplanes) as well as the initial range:

USP-ADAP – a back to back adaptor needed when you buy your first card and later for the backplane.
USP-BBP3 – a buffered 3 slot back plane, meaning it won't interfere with the Spectrums operation. It will generally require an auxiliary power supply either home built or the USP-Power supply unit (available later). A side connector allows use of the ZX printer and microdrives.
USP-BPE4 – provides a further four slots after you have the USP-BBP3.
USP-PROT – Prototyping card – use to design and test your own circuits.
USP-232D – dual channel serial RS232 interface using the sophisticated and very powerful Z80DART chip. Includes LPRINT and LLIST patches and a terminal emulator program. Baud rate 75-9600, full handshaking available. Manual 50 pages.
USP-I/O – general purpose parallel interface using the versatile Z80PI0 chip. Use to connect to parallel printers, music synthesisers, plotters, D-to-A, and A-to-D, converters, relays, LED's.... It provides two 8 bit input or output ports with 4 handshake lines. Manual 30 pages.
USP-CENT – a kit for use with the USP-I/0 for Centronics compatible printers. Includes cable from USP-I/0 and LPRINT and LLIST drivers.



USP-ADAP



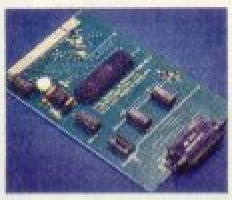
USP-BBP3



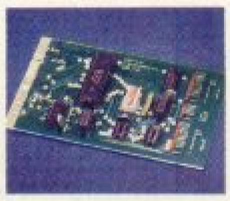
USP-BB4



USP-PROT



USP-232D



USP-I/O

Quality features –
all the boards (except the USP-PROT) have gold plated edge connectors, and solder resist both sides for long term reliability. Comprehensive documentation for beginner or expert included with each board.

USP ZX Spectrum Expansion
'make it easy on yourself'

Future plans
We've got a further 5 boards at the design stage and plans for more after that. But our policy is not to announce until they are actually in production with stock on the shelves. Sorry!

U-Microcomputers Ltd., Winstanley Industrial Estate, Long Lane, Warrington, Cheshire, WA2 8PR.

START NOW
ORDER HERE!

Qty	Item code	Price each £	Total £
	USP-ADAP Adaptor	6.90	
	USP-BBP3 3 slot buffered backplane	35.65	
	USP-BPE4 4 slot backplane extension	25.30	
	USP-PROT Prototyping board	13.80	
	USP-232D Dual serial interface	34.50	
	USP-I/O General purpose parallel interface	29.90	
	USP-CENT Centronics Kit for USP-I/O	3.45	
Please tick if VAT invoice required ☐		plus p.& p.	£1.50
		TOTAL	

Please send leaflet ☐

To: U-Microcomputers Ltd., Winstanley Industrial Estate, Long lane, Warrington, Cheshire, WA2 8PR

I enclose cheque/Postal Order made payable to U-Microcomputers Ltd., for

£.................................

Name

Address

Post Code

12 months warranty. Mail Order only.
Western Europe add £2.00

SU.11

RWP/Graphic Design

Finding a way to display important information

The ability of computers to complete calculations at high speed is wasted by badly-presented results. John Armfield reports

IF YOU want a neat display for that business game or you are about to devise your own database or electronic worksheet you need arrays, subscripted variables and a justified display. A table of numbers like that in diagram one might record the sales in each month, the calculations for a payroll, or a football score chart. Lines and columns in such a table are the key to creating arrays and displaying them on the screen in a format easy to read.

You can add them, multiply one line or column by another and save the data on tape to be recalled for another set of calculations later.

Put a DIM statement at the front of your program to allocate memory space for the table you plan, e.g., 10 DIM T(5,3) will allow for a table of numbers with five lines and three columns. For a table of numbers with five lines and one column you need only to state 10 DIM T(5). The computer will assume the 1.

Each piece of data in the table can be identified according to the line and column it occupies. In diagram one line 1 column 1 contains the number 3. So T(1,1)=3 and T(3,2)=1

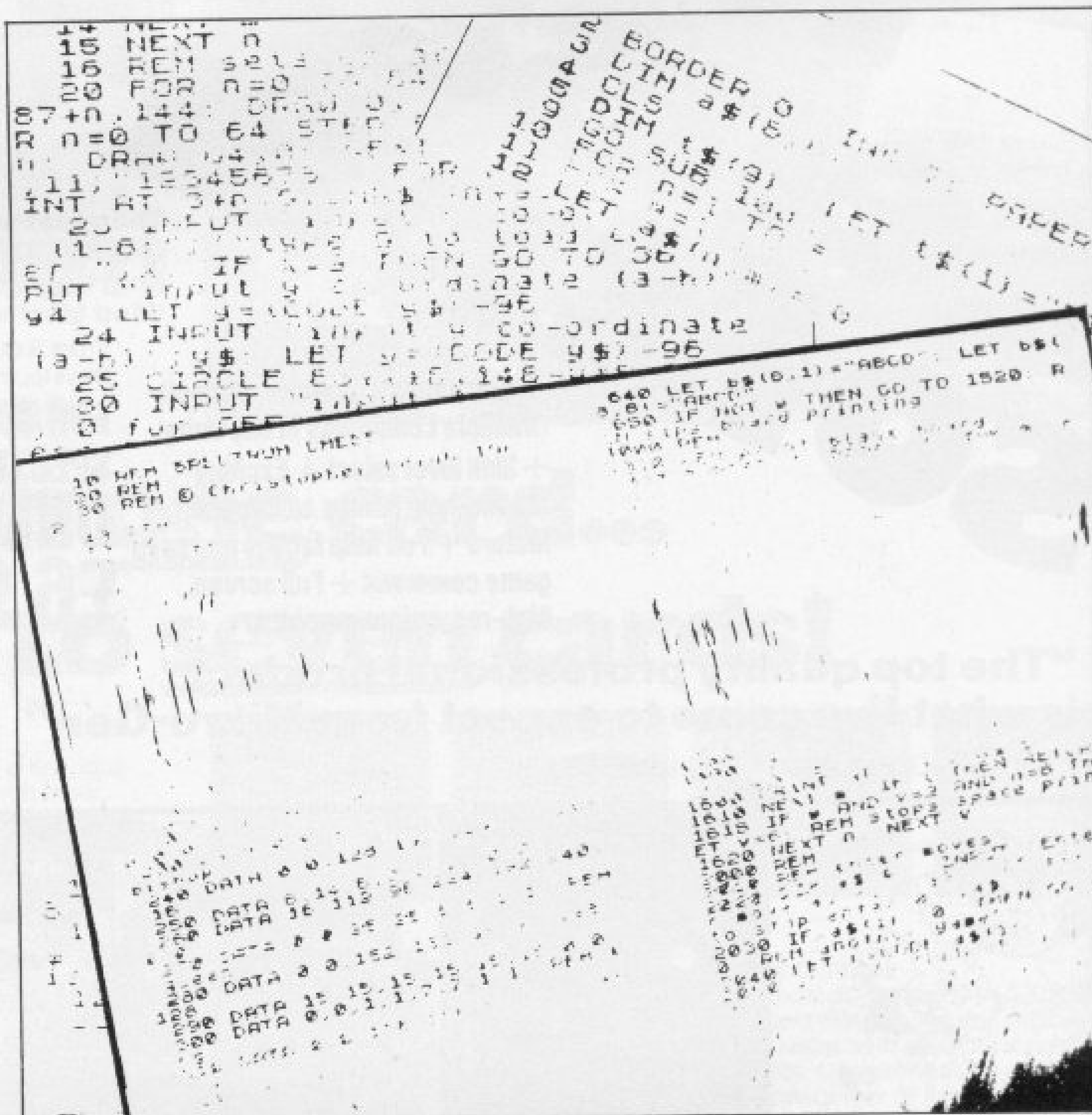
In that table — or array as it is known in Basic — T is the variable; the line and column numbers are the subscripts. You can call-up any piece of data by specifying its name.

PRINT T(1,1) will print the number 3. Any number of lines and columns are possible until you run out of memory. You can have many tables or arrays in your program, each with a different variable name or letter. It is usual to do so.

The program in diagram two will

Diagram 1. Table for variable T.

```
10 DIM T(5,3)
20 FOR L=1 TO 5
30 FOR C=1 TO 3
40 READ T(L,C)
50 PRINT TAB C*5;T(L,C);
60 NEXT C
70 NEXT L
80 DATA 3,7,5,4,6,7,4,2,1,3,4,5,13,12,14
```



read data into a table and print it. Line 10 establishes the size of the table as having two lines and three columns. The nested loops of L and C read each number in DATA into position. Enter the program and RUN it to see the result so far.

When it is more convenient data can be entered from the keyboard using INPUT instead of READ. Replace line 40 of the program with 40 INPUT "?";T(L,C). Then key-in a new set of numbers. Each one will be printed in the table as it is entered.

The PRINT statement in line 50 of the program spaces the display using TAB. In this example it multiplies the column number by five, positioning each column five spaces apart. That is a simple device when there are only a few columns and they fit on to the screen. When you have more columns it may be preferable to use the TAB statements in lines 250 to 280 of diagram three. You may have noticed that numbers with two digits or more make the display a little ragged, since they justify from the left. For a neater column of numbers we can arrange for them to justify from the right by replacing line 50 with:

Continued on page 121

Diagram 2. Read data into a table — an array — with five lines and three columns

		C: Columns 1)	2)	3)
L: Lines	1)	3	7	5
	2)	4	6	7
	3)	4	2	1
	4)	3	4	5
	5)	13	12	13

e.g., T(1,3) = 5
e.g., T(5,2) = 12

Continued from page 120

50 PRINT TAB c*5−LENSTR$T(L,C);T(L,C);

The expression LEN STR$ calculates the length of the number before it is printed and nudges it into place. Or to be even more sophisticated you can round all numbers to two decimal places and print zeros before and after the decimal point according to the need. See lines 350 to 390 in diagram three.

Insert the program in diagram three and you will be able to print either all or part of your table. For a large table select the number of columns to fit on the screen. Lines will scroll as normal.

Look more closely at the print routine. First the column numbers are printed by lines 250 to 300. As you become more ambitious you might wish to print column headings instead. Then the data is printed a line at a time, each line preceded by the line number — especially important when printing only part of the table. The line number is right-justified, too.

Using the variable TB to space the columns in this example makes spacing independent of the column number, so that a large number of columns does not cause your computer to wish it had a bigger screen. The semicolon in the PRINT statement keeps the print position in place until all the columns are complete. Try omitting it to see what happens. If you wish to space the lines

```
200 INPUT "PRINT TABLE FROM
LINE NO  ?";LS
210 INPUT "PRINT TABLE TO LINE
NO  ?";LE
220 INPUT "PRINT TABLE FROM
COLUMN NO  ?";CS
230 INPUT "PRINT TABLE TO
COLUMN NO  ?";CE
240 CLS
250 LET TB = 7
260 FOR C = CS TO CE
270 PRINT TAB TB;C;")";
280 LET TB = TB + 7
290 NEXT C
300 PRINT
310 FOR L = LS TO LE
320 LET TB = 7
330 PRINT TAB 2 - LEN STR$ L;L;")";
340 FOR C = CS TO CE
350 LET D = INT (T(L,C)*100 + 0.5)/100
360 LET A$ = STR$ (INT(100*(ABS
D - INT ABS D) + 0.5)/100) + "0"
370 LET A$ = ("." + A$ AND A$(1 TO
2) = "00") + A$ AND A$(1) = ".") + A$(2
TO) AND A$(1 TO 2) = "0.")
380 LET D$ = ("-" AND D < 0) + STR$
INT ABS D
390 PRINT TAB TB - LEN
D$;D$ + A$(TO 3);
400 LET TB = TB + 7
410 NEXT C
420 NEXT L
```

Diagram 3. Print the table.

you can add two apostrophes to your print statement, i.e., PRINT ''.

When preparing a budget for your small business each column of your table might represent a month of the year, each line a category of expenditure or income. You can use your worksheet to total your expenses and subtract them from income so that you can forecast your profit. To calculate the effect of inflation, multiply the cost of materials by 1.1 and see if you can stay in business.

Calculations on the data are the essence of an electronic worksheet. Before you start, though, make sure that your table is big enough to accept any more lines and columns you need.

> 'Make sure your table is big enough to accept any more lines and columns'

Alter the DIM statement in our working example to:

10 DIM T(6,4) and enter some data.

To multiply the numbers in column two by three, insert the routine:

```
100 FOR L=1 TO 5
110 LET T(L,3)=3*T(L,2)
120 NEXT L
```

RUN the program to see the result.

Multiply the numbers in column three by the numbers in column two and place each result in column four by amending this to:

```
100 FOR L=1 TO 5
110 LET T(L,4)=T(L,3)*T(L,2)
120 NEXT L
```

RUN the program again.

To add all the columns so that their totals are in line six insert the routine in diagram four and print the result. That gives some idea of what is possible.

A point to note about diagram four is the way in which line 110 sets the value of T(6,C) to zero at the start of the addition for each column.

INT is a valuable function used to advantage in lines 350 to 380. It simply cuts off all digits after the decimal point, which is satisfactory for rounding-down purposes. Adding 0.5 beforehand facilitates rounding-up when appropriate. Line 350 rounds the data to two decimal places. Diagram five gives a step-by-step breakdown of how it works.

Line 360 converts the number after the decimal point into a string. Line 370 looks at it and adds a decimal point if it does not have one. That applies only when there are two zeros to be printed. Line 380 converts the figures before the decimal point to a string and inserts a negative sign if the data is less than zero.

The ABS function helps the computer get its arithmetic correct in this example by making sure that it works with positive values for some of the operations.

Save your program on tape and the data will be saved with it. You will be able to load your program and use the data again, provided you start with a GOTO statement and not RUN.

You can save and load your data separately, with a Spectrum, even use it with a different program, and so stand no chance of losing it. Use the statement SAVE "Name" DATA T().

That will take all the data you have called T(L,C) in this example and save it under the name you specify. You can load it back into any program you wish by using the statement:

LOAD "Name" DATA T().

Make sure that a new program contains the appropriate DIM statement. Develop this program further into your own version of Vu-Calc. I suggest that you set up a fixed size table of say DIM T(10,10) proportions or smaller. Write sub-routines to Insert Data, Add/Subtract, Multiply, Divide, Summate lines/columns, Print.

Each of them can be called-up from a menu. Add a few other subroutines to trap keyboard errors so that a fast finger fumble does not catch you by surprise, e.g., 235 IF CE-CS>3 THEN LET CE=CS+3 will avoid the problem of asking the computer to print too many columns. Then ask a friend to run the program you have written. He should be able to use it as well as you can.

```
100 FOR C = 1 TO 4
110 LET T(6,C) = 0
120 FOR L = 1 TO 5
130 LET T(6,C) = T(6,C) + T(L,C)
140 NEXT L
150 NEXT C
```

Diagram 4. To add each column.

IF T(L,C) = 5.826

STEP	OPERATION	RESULT
1	MULT BY 100	582.6
2	ADD + 0.5	583.1
3	INT	583
4	DIV BY 100	5.83

Diagram 5. Rounding to two decimal places using 350 LET D = INT(T(L,C)*100 + 0.5)/100.

FOX ELECTRONICS
ZX SPECTRUM 32K UPGRADE



16K to 48K

ONLY
£20.99
(inclusive)

Reviewed in August Sinclair User as the "best value for money kit" available on the market.

THE KIT WITH:

- No soldering required
- Detailed fitting instructions
- 16-minute test program
- Full 48K memory
- 14-day money back guarantee
- 12-month guarantee

THE KIT THAT'S QUICK TO FIT!

AT LAST A KEYBOARD WITH A

AVAILABLE NOW

SPACE BAR

ONLY
£39.95
(inclusive)



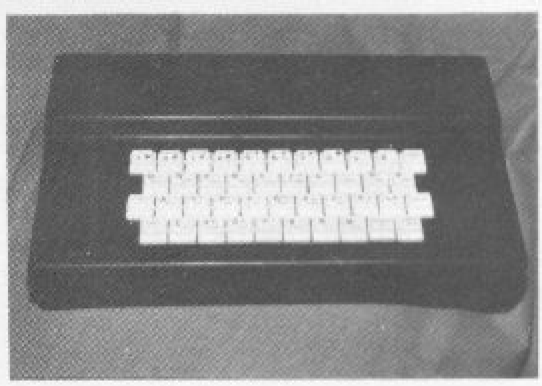
The New FDS for the Spectrum and ZX-81

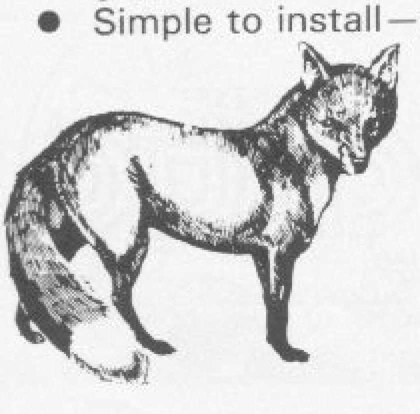
- Elegant desk-top system
- Designed for professional user
- Slimline case
- Contains all graphic characters for Spectrum and ZX-81
- Additional function keys and **SPACE BAR**
- Easy to install—no soldering required

OR . . . WITHOUT THE SPACE BAR £29.95

The FD42 keyboard for the Spectrum and ZX-81

- long a bestseller
- Sturdy, attractive case, made of ABS plastic
- Makes your Spectrum or ZX-81 into a professional unit
- 42-key keyboard
- Provides Spectrum or ZX-81 graphic characters
- Full travel keyswitches with gold plated contacts, guaranteed for 10^6 operations
- Simple to install—no soldering required





FOX ELECTRONICS

141 ABBEY ROAD, BASINGSTOKE, HANTS, RG21 9ED. Tel: (0256) 20671

SPECTRUM QUICKSHOT JOYSTICK ONLY £19.99

+85p **P&P** including INTERFACE

- Interfaced to plug straight into your Spectrum
- Full instructions
- 8-way movement
- Compatible with more software than ever!!

THE NEW! FOX SPECTRUM PROGRAMMABLE JOYSTICK INTERFACE

The very latest in electronic development: a joystick interface with:

- Complete compatibility with all software
- Proven compatability with the Microdrive
- Rigid black plastic housing which simply plugs into rear part of Spectrum—no trailing leads
- Rear edge connector for further expansion of your system
- In-built memory storage of keys for 16 different games
- Back-up batteries for complete memory storage after power-off. **NO NEED TO RE-PROGRAM EACH TIME.**
- Trickle charged battery system—batteries are recharged whilst in use.
- Full menu of joystick functions at power on.
- Room in memory for personal toolkit.
- Compatible with all replacement keyboards, eg Fuller, FD42.
- Compatible with all Atari type joystick, eg Quickshot, Competition Pro, etc.

SPECIAL OFFER UNTIL CHISTMAS — Fox Spectrum programmable interface and Quickshot joystick (as illustrated) £37.00 inclusive.

ECHO FOR YOUR SPECTRUM



£19.95
(Inclusive)

- Better sound
- Control volume
- Adjust tone
- LOAD and SAVE without switching leads
- Audible cue facility for tape programs
- DIN compatible
- No additional power supply required
- Attractive case—looks good, **SOUNDS GOOD!**

Unlike many other makes, the interface is programmed directly from the keyboard—no loading of tapes or lead connections necessary. Once programmed, the unit will store the information as long as it is required. Once again from Fox, the lastest design at the best price—only **£28.50** inclusive.

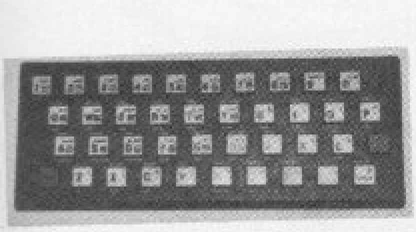
ZX-81 HARDWARE



PANDA: only £19.95
The famous Panda expandable RAM pack.

- 16K add-on memory
- 12-month guarantee

EXPANSION MODULE: expands 16K Panda to 32K **£14.50**



PRESS-ON BUTTONSET KEYBOARD:
calculator-type feel
£9.95

Plese send SAE for full catalogue. Callers welcome by appointment, 24-hour answering machine service.

ALL PRICES ARE INCLUSIVE OF VAT. OVERSEAS CUSTOMERS PLEASE ADD £3.50 POSTAGE & PACKING

Please supply the following.

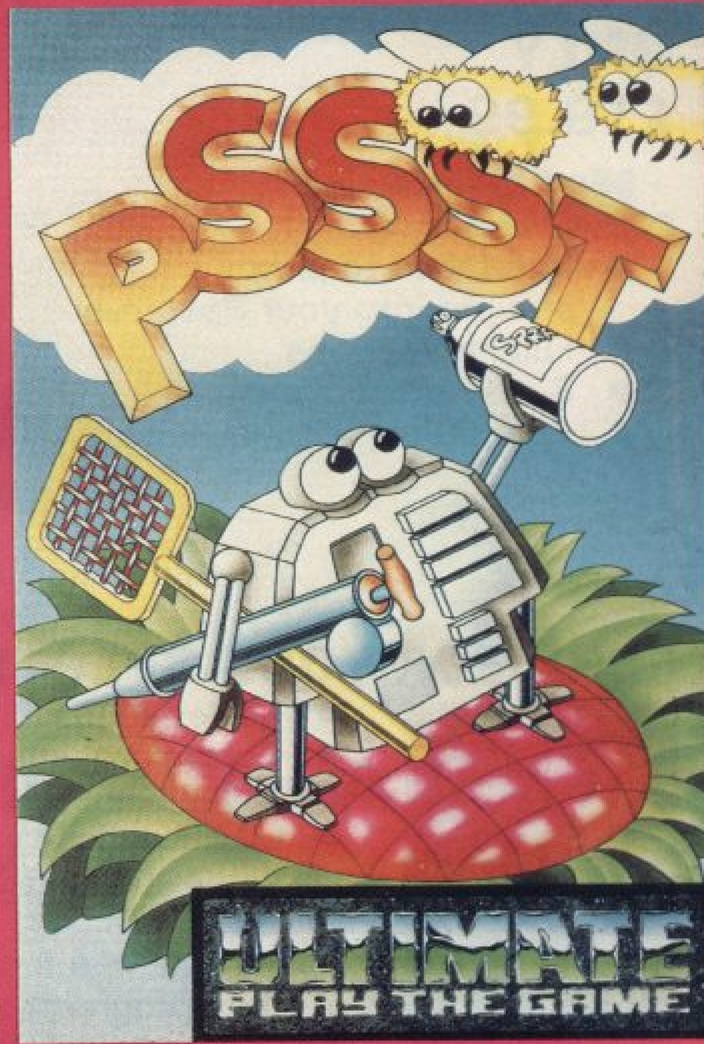
Spectrum Upgrade £	Master Unit £ ....
Spectrum/ZX-81 FDS £............	Spectrum Echo £ ....
Spectrum/ZX-81 FD42 £	16K Panda £ ....
Spectrum Joystick £	16K Module £ ....
Programmable Interface £.........	Interface & Joystick £ ....

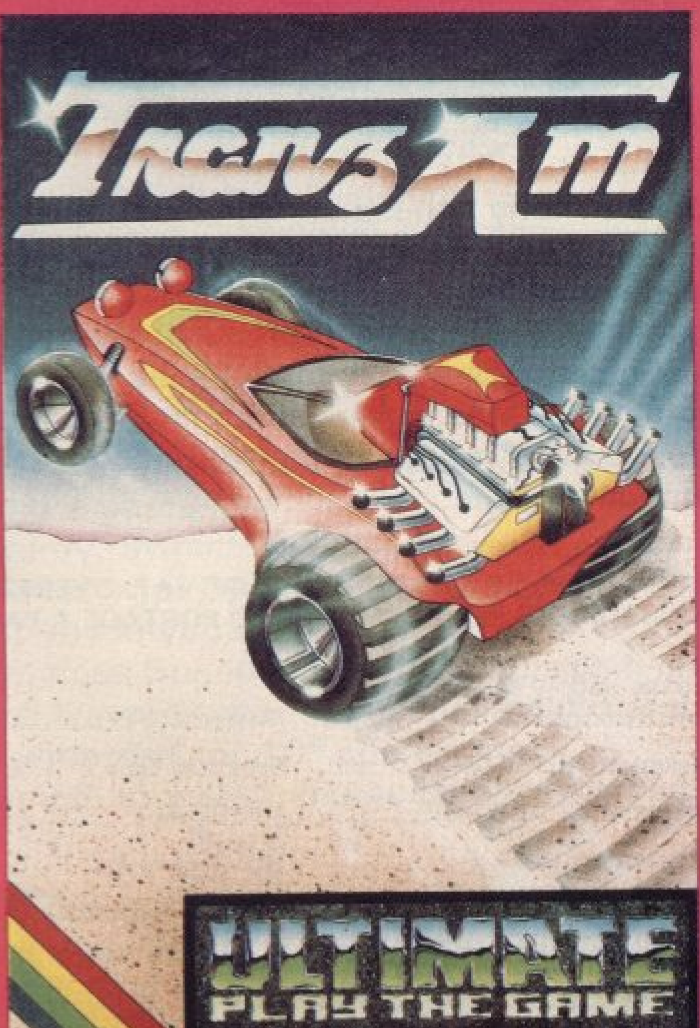
I enclose Cheque/P.O. payable to Fox Electronics total £.....
or debit my Visa card
Name ____________________
Address ____________________
____

JET PAC–
16/48K ZX Spectrum or 8K Expanded VIC20

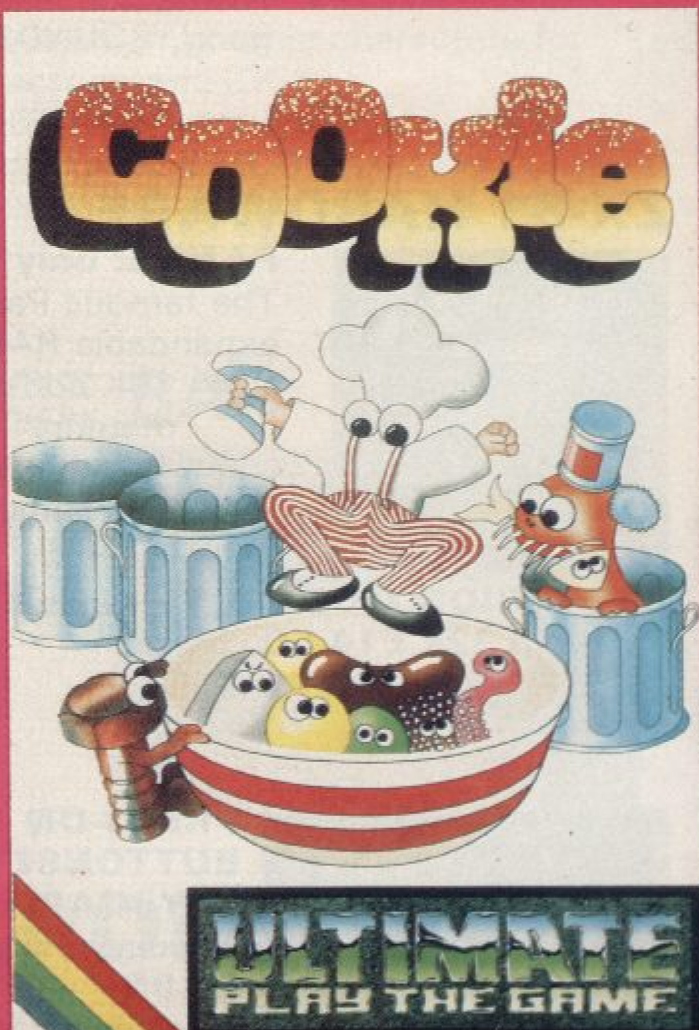


PSSST–
19/48K ZX Spectrum





TRANZ AM–
16/48L ZX Spectrum



COOKIE–
16/48K ZX Spectrum

LUNAR JETMAN –
48K ZX Spectrum



LUNAR JETMAN – For the **48K Sinclair ZX Spectrum.**

LUNAR JETMAN – The **ULTIMATE** Intergalactic **G.A.S. (Graphic Arcade Simulation)** Adventure Space Battle.

LUNAR JETMAN – Arcade standard, 100% machine code, incredible sound effects, amazing smooth high resolution graphics, the totally new addictive concept and all those extra features you expect from the **ULTIMATE** games people.

Design – The **ULTIMATE PLAY THE GAME** design team.

ATIC ATAC – For the **48K Sinclair ZX Spectrum**

ATIC ATAC – The super spooky 3D horror **G.A.S. (Graphic Arcade Simulation)** Adventure game.

ATIC ATAC – Arcade standard, 100% machine code, incredible sound effects, amazing smooth high resolution graphics, the totally new addictive concept and all those extra features you expect from the **ULTIMATE** games people.

Design – The **ULTIMATE PLAY THE GAME** design team.

£5.50 each, including VAT, first class postage and packing within UK.

These games should be available from **W. H. SMITHS, BOOTS, JOHN MENZIES, LASKYS, SPECTRUM CENTRES,** other **large department stores** and all **good major software retailers.** Alternatively, send the coupon to **ULTIMATE PLAY THE GAME** for immediate dispatch by return, subject to availability.

Dealer enquiries welcome, Phone (0530) 411485

ULTIMATE PLAY THE GAME is a Trade name of Ashby Computers & Graphics Ltd., The Green, Ashby de la Zouch, Leics. LE6 5JU.



ATIC ATAC –
48K ZX Spectrum

Post this coupon to:
ULTIMATE PLAY THE GAME, The Green, Ashby de la Zouch, Leicestershire LE6 5JU.
Please rush me the following:

- ☐ LUNAR JETMAN
- ☐ COOKIE
- ☐ ATIC ATAC
- ☐ JET PAC (8K Expanded VIC 20)
- ☐ TRANZ AM
- ☐ JET PAC
- ☐ PSSST

I enclose cheque/PO for £ ....

Name..........................

Address..........................

....

Post Code..........................

Returning to basics helps solve problems

Andrew Hewson tackles some misconceptions

READERS will be aware that I use letters I receive as the basis for an article on a given topic rather than restricting myself to direct answers to each question posed. I use the approach principally to make the column interesting to all readers rather than the few who may share a particular problem with a particular correspondent. As a result, more than a single sentence from each letter is rarely published.

Recently I have become aware from reading a number of letters again that the questions posed are often based on a misconception of one kind or another, even to the extent that the fundamental question does not exist. It is difficult to answer such letters without publishing them more or less in full. To illustrate the point, consider the following from Larry Simpson of Mansfield. He writes:

I gained the impression from reading about machine code that it was an improvement on Basic partly because hex numbers were used which were more closely related to the binary system of the computer. If so, why do you recommend the use of a hex loader program whose only purpose appears to be to convert hex code back into decimal and poke it into memory?

In attempting to answer the question I feel like the man who, when asked the directions to a particular town, replied "If I were going there I wouldn't start from here". In the same way I cannot tackle Simpson's question without backtracking and correcting some of his ideas.



• Please address problems and queries to Andrew Hewson, Helpline, Graham Close, Blewbury, Oxfordshire.

First, it is not correct to say that machine code is an improvement on Basic. I would prefer to say that some tasks can be undertaken by programs written in machine code which could not be undertaken by a Basic program or, if they could, they would be too slow to be satisfactory. Thus it is necessary sometimes to resort to machine language to complete a specific programming task. Writing machine code programs, however, is a skilful and time-consuming process; nobody in his right mind would choose to write a routine in machine language if a Basic routine could do the same job at an acceptable speed.

Second, the difference between Basic and machine language has little to do with the difference between hexadecimal and decimal. In Sinclair computers a Basic program is interpreted each and every time it is executed. In other words, each program line is analysed by the routines in ROM to work out the exact form of each command and then the command is executed.

A machine language program, in contrast, is not analysed at all by the ROM routines, although the program may make use of ROM routines for its own purposes; rather the form of the machine language is such that it drives the microprocessor at the heart of the computer directly.

It is as if the analytical capabilities of the ROM routines which form the Basic interpreter are a very crude imitation of those of the human brain. When a soldier on parade is given the command Forward March his brain interprets the command and despatches a complex sequence of electrical impulses to the muscles of his arms and legs which cause them to contract and relax in such a way as to drive his body forward in the required fashion. The electrical impulses form the "machine code routines" which drive his muscles.

In principle it would be possible to mimic those impulses artificially and, given sufficient surgical skill, to direct them into the soldier's spinal column so that he could be made to walk involuntarily without his brain performing its usual interpretive function.

Finally, I do not recommend the routine use of the simple loader programs which I have included in the column from time to time. Their purpose is to enable all readers to load and try the machine code routines which also appear in the column. Simpson is

Decimal	Assembler Code	Comment
42 101 92	LD HL,(STKEND)	Load HL with the address of the beginning of free memory
235	EX DE,HL	Transfer the value to DE
38 0	LD HL,0	Clear HL
57	ADD HL,SP	Add the address of the end of free memory into HL
237 82	SBC HL,DE	Subtract DE from HL
68	LD B,H	Transfer the result to
77	LD C,L	the BC register pair
201	RET	Return to Basic

Table 1. A ZX-81 program to calculate the current amount of remaining free memory.

```
10 REM Space for machine code routine —
at least 65 characters
20 FOR I=16514 TO 16614
30 INPUT A
40 IF A<0 OR A>255 THEN STOP
50 POKE I,A
60 PRINT I,A
70 NEXT I
```

Table 2. A decimal loader program for the ZX-81. The REM statement at line 10 is essential. The contents of the REM statements will have changed after the program is executed.

```
10 LET I=PEEK 16396+256*PEEK
16397
20 LET J=PEEK 16400+256*PEEK
16401
30 PRINT "ENTER THE CHARACTER
TO BE DELETED"
40 INPUT Z$
50 LET Z=CODE Z$
60 FOR K=I TO J-1
70 IF PEEK K=Z THEN POKE K,0
80 NEXT K
```

Table 3. A ZX-81 routine to delete selectively a character entered by the user from the ZX-81 display.

correct in one respect — their only function is to POKE numbers, in decimal or hexadecimal as appropriate, into locations in memory, because it is those numbers which cause the microprocessor to perform the required task.

Where can I find the addresses of the Spectrum ROM routines and can you explain how to use them? asks Michael Dobson of Barrow-in-Furness. The most comprehensive sources of information are the books by Dr Ian Logan, *The Complete Spectrum ROM Disassembly* and *Sinclair ZX-81 ROM Disassembly*, parts A and B. The books list the entire contents of the appropriate ROM with a certain amount of information on the action of each section of code.

They are unsuitable for a beginner because a great deal of material concerning the operation of the Z-80 processor is taken for granted. Hence I would suggest that the average reader starts with one of the many introductory books on assembly language programming which usually contain information on some of the routines.

Jean-Hugues Belpois of Besançon, France requests information on such a routine. He writes: **Can you publish a routine which will print the amount of free memory remaining for use on a Spectrum?**

It is not necessary for me to offer such a routine for the Spectrum because a similar one already exists in ROM at address 7962. The routine returns, via the BC register pair, the amount of ROM and RAM already in use on the 48K machine — or the amount plus 32768 on the 16K machine. Hence to use the routine on both the 16K and the 48K machine enter: PRINT 65536 — USR 7962

The ZX-81 ROM does not contain the equivalent routine, so I have shown an alternative in table one. The routine can be loaded with the inevitable decimal loader listed in table two. To call the routine enter:

PRINT USR 16514

Steven Neal of Stratford-upon-Avon asks an interesting question. He writes: **How can specific characters be removed from the screen on the ZX-81 while leaving the bulk of the display intact?** The solution to the problem is straightforward. In essence, it is necessary to scan through the display file, testing each location to see if it contains the code of the character to be deleted. If it does, then POKE zero — i.e., the code for a blank — into the location. The display file lies in the area in memory between the addresses pointed to by the DFILE and VARS systems variables. Those two variables are held at 16396 and 16400 respectively. A suitable Basic program is listed in table three.

That type of routine can be used to tidy the ZX-81 display when successive calculations are being performed. In those situations an annoying problem can arise when the PRINT AT command is used to over-write the result of a previous calculation with a new value, because the command does not necessarily cover the result completely. For example, if 3.333333 is over-written by 4.5 the display will show 4.533333, which is very misleading.

Clearly a routine which deletes all numbers from the display selectively is required. The routine must also be capable of detecting and deleting a decimal point embedded in a number and the presence of a number in scientific notation, e.g., 130,000,000 which is PRINTed as 1.3 E 8. The machine code routine listed in table four performs all those functions.

I wrote a machine code routine to undertake the task because a Basic program would have been too slow to be satisfactory. The routine illustrates the speed of machine code; when it is used digits on the screen disappear quickly.

Unfortunately it is not possible to write an equivalent routine for the Spectrum, because the display is handled in a different fashion.

The Basic program in table five illustrates the technique. The first loop PRINTS the letters in blue INK on white PAPER and the numbers in black INK on white PAPER. The attribute value of the black/white combination is 57. Hence the second loop searches the attribute file, locating the bytes which contain 57. When such a location is found its contents are changed to 63.

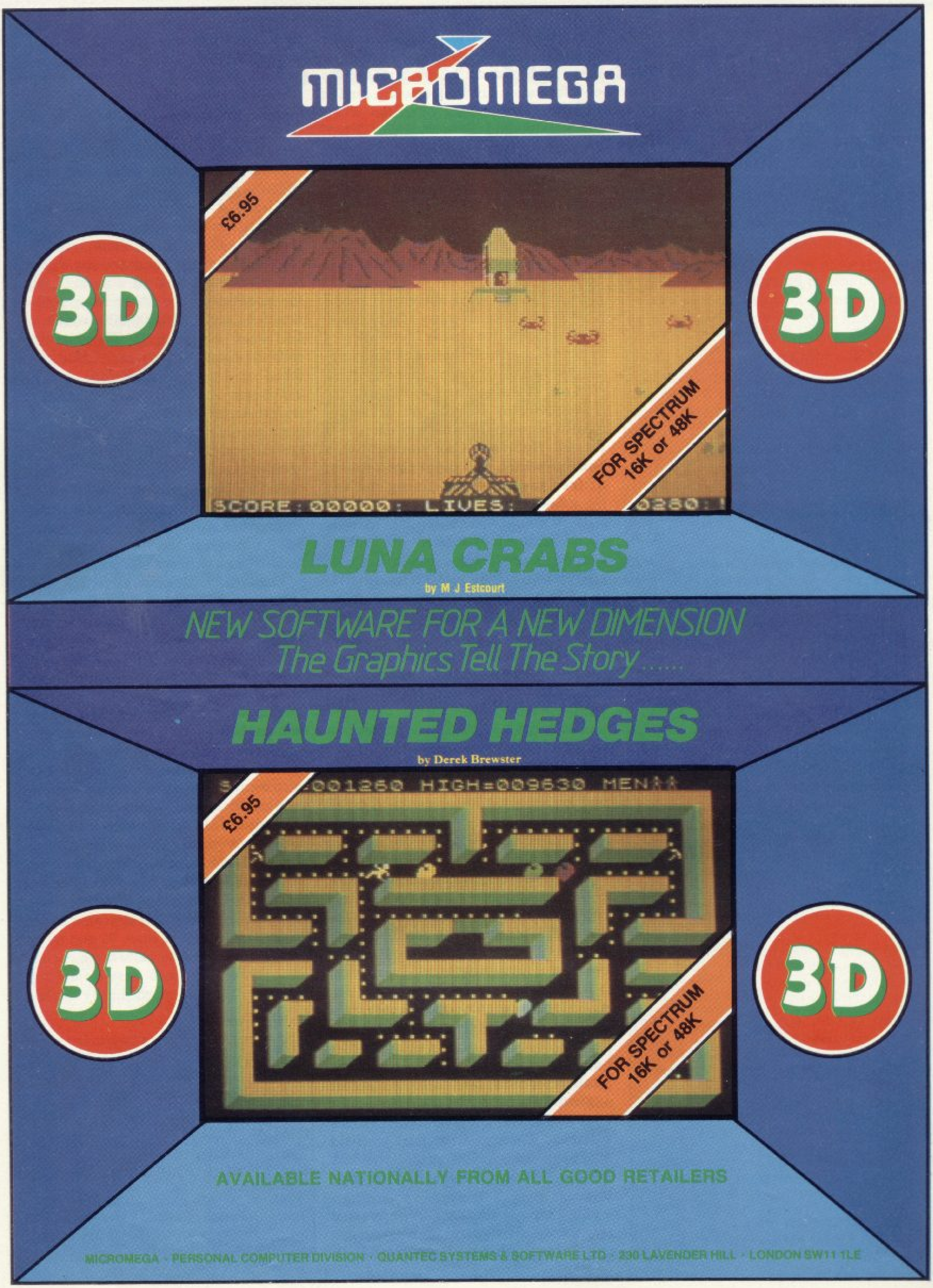
Finally, an apology. I write the column using a word processor package on a microcomputer. Unfortunately the printing head of the printer I use does not have a greater than or a less than sign, so I add those characters by hand before the manuscript is despatched to the editor. Unfortunately I forgot to do so for the column which appeared in the August issue. Hence lines 50 and 60 of the Basic program in table three of that issue should in each case contain a greater than sign immediately before the 57.

Decimal	Assembler	Comment
237 75 12 64	LD BC,(16396)	Load BC with address of beginning of display file
42 16 40	LD HL,(16400)	Load HL with address of end of display file
167	AND A	
237 66	SBC HL,BC	Calculate length of display file
68	LD B,H	Transfer result
77	LD C,L	to BC register pair
42 12 64	LD HL,(16396)	Load HL with address of beginning of display file
126	LD A,(HL)	Beginning of main loop — copy byte pointed to by HL to A
254 38	CP 38	Jump if greater than or equal to 38 (one
242 184 64	JP P,16568	greater than the code for 9)
254 28	CP 28	Jump if less than 28
250 184 64	JP M,16568	(the code for 0)
54 0	LD (HL),0	Byte contains a digit hence over-write
35	INC HL	Increment HL
126	LD A,(HL)	Copy byte to A register
254 42	CP 42	Jump if not equal to 42
32 2	JR NZ,2	(the code for E)
54 0	LD (HL),0	Byte contains E hence over-write
43	DEC HL	Decrement HL
43	DEC HL	Decrement HL
126	LD A,(HL)	Copy byte to HL
254 21	CP 21	Jump if equal to 21
40 8	JR Z,8	(the code for +)
254 22	CP 22	Jump if equal to 22
40 4	JR Z,4	(the code for −)
254 27	CP 27	Jump if not equal to 27
32 2	JR NZ,2	(the code for .)
54 0	LD (HL),0	Byte contains +, − or . hence over-write
35	INC HL	Increment HL
35	INC HL	Increment HL
11	DEC BC	Decrement length of display counter
62 0	LD A,0	If remaining length
184	CP B	of display
32 210	JR NZ,-46	is not zero
185	CP C	then jump to
32 207	JR NZ,-49	beginning of main loop
201	RET	Return to Basic

Table 4. A machine code program to delete all numbers appearing on the ZX-81 display. The program must be loaded into a REM statement forming the first line of a Basic program.

```
100 FOR I=1 TO 20
110 PRINT INK 1 ; PAPER 7 ; "ABCDEF
" ;
120 PRINT INK 0 ; PAPER 7 ;
1234.56789
130 NEXT I
140 PAUSE 9999
200 FOR I=22528 TO 23551
210 IF PEEK I=56 THEN POKE I, 63
220 NEXT I
```

Table 5. A Spectrum program which illustrates the technique for clearing digits selectively from the display by manipulating the attributes file.



MICROMEGA
£6.95
3D
3D
FOR SPECTRUM 16K or 48K
SCORE:00000: LIVES:
LUNA CRABS
by M J Estcourt
NEW SOFTWARE FOR A NEW DIMENSION
The Graphics Tell The Story......
HAUNTED HEDGES
by Derek Brewster
£6.95
HIGH=009630 MEN
3D
3D
FOR SPECTRUM 16K or 48K
AVAILABLE NATIONALLY FROM ALL GOOD RETAILERS
MICROMEGA · PERSONAL COMPUTER DIVISION · QUANTEC SYSTEMS & SOFTWARE LTD · 230 LAVENDER HILL · LONDON SW11 1LE

There are moves towards technical end of market

John Gilbert reviews a new development in publishing but discovers there is still a great deal of room for improvement

WE FORECAST two months ago that books about computers would become more technical towards the end of the year. That has happened but a large gap is still left in that part of the market.

Ian Sinclair's new book, *Inside Your Computer,* is an example. It provides a general introduction to what a computer is made of and how it functions but offers little new information. The author was accurate to describe it as being aimed at beginners, because it could not be recommended to anyone who has had a computer for more than six months and has read any computer magazines.

Although it is a simplistic introduction there is little wrong with what it preaches. Sinclair has taken a diverse set of subjects and put some structure into them. The result is a clear definition of both the hardware and software of a machine.

The author refers to specific machines several times but that is not often sufficient. The ZX-81 and Spectrum are dragged into the explanations twice but some of Sinclair's descriptions are difficult to understand because one cannot visualise the machine he is explaining. The book compensates for that deficiency to some degree, however, with photographs and diagrams. For a technical book for the beginner there are too few illustrations, although those which are included provide some degree of expansion and enlightenment on the text.

On the whole the book is disappointing, because from the taster on the back and the picture on the front the reader could be led to expect more. It can be recommended to the complete beginner who has just bought a computer or to someone who has no computer but wishes to know how one works. The book is published by Granada Publishing and costs £4.95.

First Steps With Your Spectrum, by Carolyn Hughes, is another book for beginners dealing only with software. It is published by Armada, a company which specialises in children's products and a first attempt at breaking into the computer field has worked.

The book contains a satisfactory combination of text and illustrations. Unlike many other publications which launch straight into an explanation of a computer language and how to use it, the author takes time to explain what a computer can do and why it would be useful.



Written in a style anyone should understand, the book would be equally useful to an adult who knows nothing about computers but wants to learn.

The author has included several programs designed specially with beginners in mind. Some of them, such as the fruit machine, are predictable but others, such as Elephant, where you have to build an elephant, and Morse Mole, where you have to find a bleeping rodent, are brilliantly simple and perfect for beginners.

Well worth recommending, it can be obtained from Armada Original Publishing and costs £1.25.

Spectrum Adventures, by Tony Bridge and Roy Carnell, is a sight for sore eyes and it also fills a very important gap in the computer book market. It fulfils two functions. First it provides a guide to playing adventure games. It gives a general history of adventure gaming and provides details of some of the major adventure games available on the Spectrum, including The Hobbit and the adventures A, B, C and D from Artic Computing. That part of the book provides some good tips for the old and new adventurer alike, without revealing too much.

The second function is to show how an adventure game is written. The example, The Eye of the Star Warrior, was written by Carnell, who also wrote the Black Crystal and, like its counterpart, it is a graphics adventure.

The book provides a wealth of information for anyone interested in dungeons and dragons. Its authors have made the book interesting and exciting and have provided a complete text book for that aspect of software. It can be obtained from Sunshine Publications for £5.95.

Just as esoteric but much more complicated is *Z-80 Machine Code for Humans* by Alan Tootill and David Barrow. The title is unfortunate as the book seems to be a regurgitation of others which follow the same lines. It provides concrete examples of what can be done when you and not the Basic operating system control the microprocessor.

The unfortunate aspect is that it is difficult to tell whether it is a machine code trainer or if it is a book for programmers who know how to use the language but do not know what to do with it.

There are several machine code routines in the book, including printing a string of text on the screen all the way up to drawing high-resolution lines.

The book is not machine-specific but most of the routines should work on the Spectrum and some of them on the ZX-81. Any reader, however, should make some allowance for the fact that Sinclair machines use a Z-80A processor and not the Z-80. In most cases there is little difference but you should be careful to check.

Granada Publishing, PO Box 9, Frogmore, St Albans, Hertfordshire, AL2 2NF.

Armada by Fontana Books, 8 Grafton Street, London, W1X 3LA.

Puffin Books, Penguin Books Ltd, Harmondsworth, Middlesex.

Sunshine Publishing, 12–13 Little Newport Street, London WC2R 3LD.

The Hobbit. Now the best is a

"After a very short time I found that 'The Hobbit' was becoming almost a way of life rather than a game, and so when I finished it for the first time I was partly sad because I felt that all the fun and adventure had ended, but I was wrong. Even now I am discovering new things about the game and feel that it will be some time until all of its secrets are revealed to me."
MR. J. STERN, Herts

"I have at last received your 'Hobbit' program and would like to congratulate you on its excellence. After four days of sweat and tears I have completed only 37.5 per cent of the adventure. The program has lived up completely to expectations, and there is no doubt about it being the best production for the Spectrum to date. You have surpassed all others w... program."

"A lot of fun."
COMPUT...

"The excellent gra...
The exciting differ...
is that it is possibl...
converse with all t...
meet and ask their...
recommend this g...
Tolkien, or novel a...
POPULAR COMP...

"I am writing to co...
'Hobbit'. I think it is one of...
ingenious programs I have ...
to use. It has kept me stum...
months. I think the effort th... has go...
writing a program like this must have be...
enormous. The effects are brilliant to say th...
least."
JEREMY CHESTER

"T... ...it takes first place in the new
... quality and value for money."
SINCLAIR USER

...cations in the Adventure are
...e excellent graphics. We
...mplete 7.5 ... of

...ures. The
...ed plot
...erior to any
... for the

COMPUTER

...isty Mountains
..., this game is
...eat to play and is No. 1 for
...nd excitement."
GORDON DEMPTSTER, Scotland

"Thanks again for an excellent game in 'The Hobbit'. I feel I have really got my money's worth out of playing time. Congratulations!"
MR. P. RUSHTON, Leeds

"The most powerful computer game yet invented."
COMPUTER WEEKLY

"Within my circle of friends this game has become something of an obsession. We meet every Friday night at someone's house and spend 3-4 hours on 'The Hobbit'. Friday night would not be the same without 'The Hobbit'."
CHRISTINE VERCHILD, Wilts

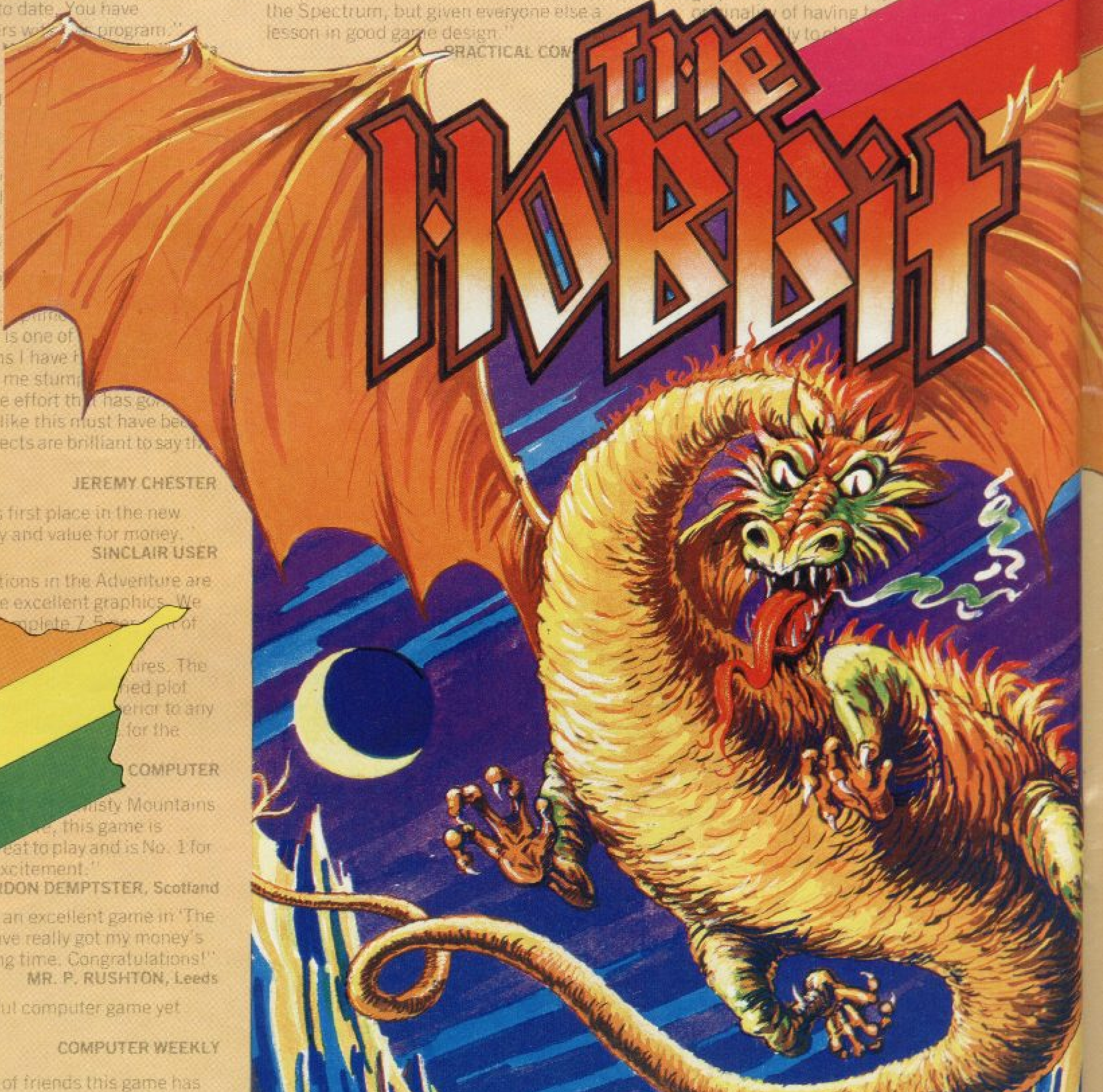
"One new Adventure game stands head and shoulders above the rest. It alone almost provides you with a good enough reason to buy a 48K Sinclair Spectrum. Not only does The Hobbit produce drawings of the main scenes, but it also understands proper sentences rather than pairs of words for its commands. It comes with a copy of J.R.R. Tolkien's classic book of the same name. It is the program with the most detailed and best written documentation ever."
WHAT MICRO

"This is an impressively packaged Adventure game which makes good use of the Spectrum's colour graphics. They have not only produced one of the best games for the Spectrum, but given everyone else a lesson in good game design."
PRACTICAL COM...

"I am the owner of a copy of 'The Hobbit' which is wonderful entertainment, and very challenging. I have other tapes and publications of yours, all of which are excellent."
MR. D.J. BURGH, Kent

"Having received the most excellent piece of programming I have ever seen, we have had no social life whatsoever. 'The Hobbit' has been dominating our lives since January and many nights have been spent until 3 o'clock trying to conquer it."
SIMON ROGERS, Avon

"I have recently purchased your excellent
adventure game 'The Hobbit'. This ...
greatly enhanced by the use of ...
graphics, its availability in ...
... of having ...



Melbourne House

sinclair special

5



Inside...
New Interface 2 and ROM cartridges!
New Software!

TAKING NEW SOFTWARE IN NEW DIRECTIONS

You'll see that this issue of Sinclair Special devotes considerable space to software. Why, when we've so much to say about hardware and peripherals? Simply because at Sinclair we believe in supporting first-class hardware with first-class software.

This month sees the start of a new commitment to education in our catalogue, both for adults and children.

In the field of micro theory, we've programs like Beyond BASIC and Make-a-Chip, which take you from the creation of simple ZX® assembler subsets to simulated circuit design projects.

There's Musicmaster, to teach you music terminology, note values and composition.

And if you're keen to beat your Spectrum at chess (which can be hard), you'll certainly want to try Chess Tutor 1, the first program in a complete chess masterclass.

Coming soon...

In the pipeline are many new releases, some of which break completely new ground. LOGO and micro-PROLOG for instance. They're fifth generation languages which will take you and your Spectrum closer than ever before to the creation and application of artificial intelligence.

A formal agreement between Sinclair and Macmillan Education has been announced, the first results of which will be published this autumn. These consist of five programs in a complete early reading course plus the first four of a series of programs based on Macmillan's top selling Science Horizons Scheme. All programs are designed for use in schools or the home.

And with Blackboard software, we're publishing six more home education programs for primary school children. Covering alphabet, spelling and punctuation, each of these programs is a true gem, unlike any other education software, and fascinating to run. Even for adults!

I believe that these new titles represent a major advance in educational software for the home.

New ROM software too!

You may well have heard news of ZX Interface 2® and ROM cartridge programs. You'll find full details of the Interface and its software on the facing page (and there's an order form on the back page too!). These offer an instant games playing facility at unbeatable prices, and expand the possibilities of using your Spectrum in yet another direction.

Alison Maguire
Applications Software Manager

SOFTWARE UPDATE

The latest cassette software for ZX® Computers



Chess Tutor 1
For 48K RAM Spectrum. **£9.95.**

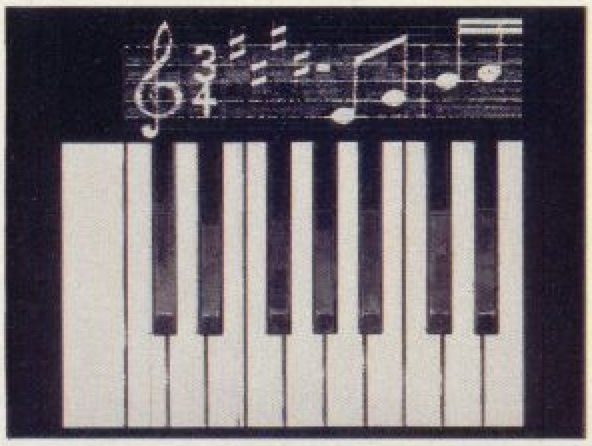
Chess Tutor is a new way of learning all about chess – using your ZX Spectrum.®

It starts from the beginning by teaching you about the chess pieces and the way they move – including castling, en passant, promotion, check, checkmate, stalemate and perpetual check.

Then it teaches you the basic tactics – pins, forks, double attacks and skewers.

There are over 120 exercises and over 200 questions for you to answer – with demonstrations and hints from your ZX Spectrum when you want them.

You can choose which parts of the course you want – and even experienced players may be surprised at what they can learn from Chess Tutor.

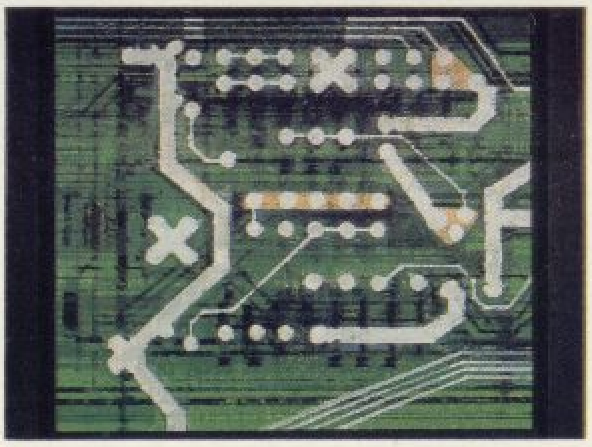


Musicmaster
For 48K RAM Spectrum. **£9.95.**

Musicmaster turns your ZX Spectrum into a musical instrument which will not only play tunes, but will also demonstrate key signatures, durations of notes, and scales.

You can write your own tunes – in any key – play them over and over again, save them on tape, modify them.

You can either write your music on a stave, or place a simple overlay on your Spectrum for a 17-note keyboard.

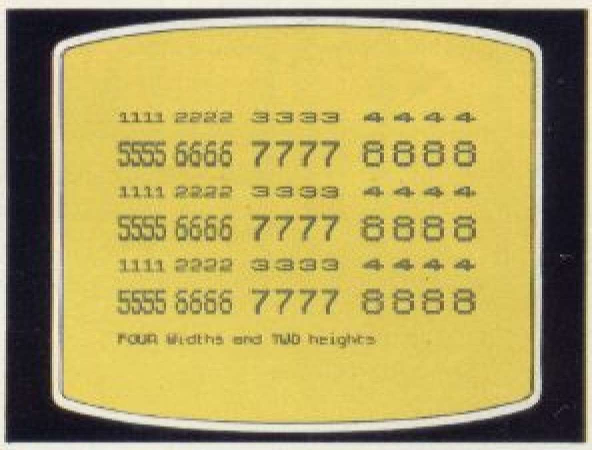


Make-a-Chip
For 48K RAM Spectrum. **£9.95.**

Make-a-Chip teaches you the basic elements of circuit design, shows you how they fit together, and then lets you design and test your own circuits.

When you have designed a circuit, you can give it inputs and outputs and your ZX Spectrum will check it for you. Then it will run it, or tell you what's wrong so that you can modify it.

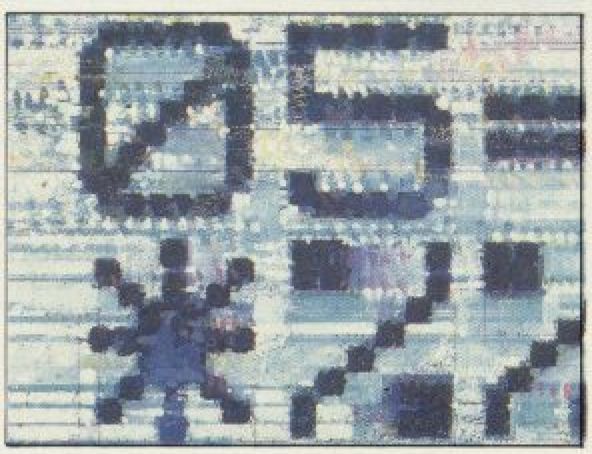
Make-a-Chip is a fascinating way of finding out how computer logic works.



Print Utilities
For 16K and 48K RAM Spectrum.
£9.95.

Increase the printing and display facilities of your ZX Spectrum with the Print Utilities program.

Print Utilities enables you to enhance your programs by generating characters of eight different sizes which you can place anywhere on your screen.



Beyond BASIC
For 48K RAM Spectrum. **£9.95.**

Takes the agony out of assembler. Takes the mystery out of machine code.

Beyond BASIC gives you a deeper insight into the workings of your ZX Spectrum. It explains what happens inside your micro when you run a program, and it teaches you simple Z80 machine code programming.

A major feature of Beyond BASIC is that it enables you to write your own Z80 assembler programs – then you can actually see on your screen how they affect the ZX Spectrum memory and registers.

ZX INTERFACE 2®

The New ROM Cartridge/Joystick Interface

Loads programs instantly!
Takes two joysticks!
Just plug-in and play!

The ZX Interface 2 is the latest new peripheral for the ZX Spectrum® system. It enables you to use new ZX® ROM cartridge software: plug-in programs that load instantly. It allows you to use two standard joysticks, without the need for separate, special interfaces.

To use new ZX ROM cartridge programs, just connect Interface 2 to the rear of your Spectrum or Interface 1 and plug in the cartridge of your choice. The program is then loaded, ready to run!

You can use any joystick that has a 9-way D plug. Use one or two of them for extra fun with ZX ROM cartridge or Sinclair cassette programs – or with dozens of other Spectrum-compatible programs!



SEE BACK PAGE FOR ZX INTERFACE 2 AND ROM CARTRIDGE ORDER FORM!

...AND BRAND NEW ROM CARTRIDGE SOFTWARE!

There's already plenty of choice of ZX ROM cartridge programs for your Spectrum. Some are old favourites, in an exciting new form. Others are new.

And now, thanks to ROM cartridge technology, you can run them *all* on a 16K RAM Spectrum, even if they were originally written only for 48K machines!

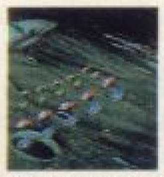
Every ROM cartridge program loads fast and faultlessly. No wires, no waiting, no worries about loading errors! All of them are affordably priced too, at £14.95.

Backgammon



Everything you need to play the famous and deceptively simple board game. Board, stones, rolling dice and doubling dice are shown in full colour and high resolution. Choose from four levels of skill to suit experts and beginners alike – full rules are included.

Space Raiders



Your skill is all that's stopping successive waves of aliens from destroying Earth. Use your gun base to attack. Shelter behind buildings... move out and blast the passing alien soaceship!

Full-colour high-resolution graphics with sound.

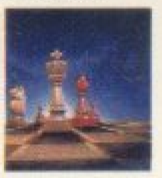
New! PSSST



Robbie the Robot sits in his garden. Help him fetch compost to cultivate his prize Thyrgodian Megga Chrysanthodil. Help him make the right choice of pesticide, to ward off devilish insects. Stop the insects breeding to overwhelming numbers before Robbie's plant has bloomed. PSSST is horticulture with a horrendous twist!

One and two player option, with a host of features including sound effects.

Chess



This sophisticated program does everything you'd expect at board game level, and much more besides.

The high-resolution chessboard and pieces are arranged in a row and column system, so it's easy to key in your moves.

At any stage of the game you can request the computer to suggest a move, reverse roles or change the level of skill.

Full-colour high-resolution graphics.

Planetoids



Dodge and swerve using your thrust button, turn on a planetoid... fire! But beware – the alien ship moves fast to destroy you with cluster bombs. And when it comes to the crunch, use your hyperspace button!

Full-colour high-resolution graphics with sound.

Hungry Horace



Horace is forever being chased around the park by guards.

He steals their lunch, eats pathway flowers and creates chaos in the park by ringing the alarm!

You'll have to be quick to keep Horace out of trouble!

Full-colour high-resolution graphics with sound.

New! Tranz Am



Set in a future time ruled by cars and trophies, in a land where petrol replaces gold, and status is possession of the 8 Great Cups of Ultimate.

Driving your Super Blown Red Racer, use your skill to outwit and crash the Deadly Black Turbos. Use your instruments to locate and collect the trophies – before you overheat or run out of fuel.

A program with outstanding multi-directional movement, graphic features, and a playing area equivalent to more than 600 times actual screen area.

Horace and the Spiders



Guide Horace on the hazardous journey to the cobwebbed house full of poisonous spiders.

Safely in the house, you must move along cobwebs, choose a spot...and jump on it! The spiders will be in a frenzy – scuttling to repair their precious web.

And when a spider is spinning a new section, you're safe to attack and destroy it!

Kill all the spiders, and a new web appears... with even more spiders to catch.

Full-colour high-resolution graphics.

New! Cookie



You're Charlie the Chef, who keeps his ingredients locked in the larder. But if the ingredients escape, they bring the inedible Nasties with them!

You must daze the escaping ingredients with flour bombs, and knock them into the mixing bowl. Stop them getting into the dustbin, at all costs! And beware of Nasties that get into the mixing bowl!

Cookie is fast-moving panic in the pantry, with a cast of real characters. A program to make you smile – and sweat!

New! Jet Pac



As Chief Test Pilot of the Acme Interstellar Transport Company, your task is to deliver and assemble spaceship kits. On your way round the galaxy, you're free to collect precious stones and gold.

The catch? Rocket fuel is precious and scarce. And the aliens don't take kindly to the theft of their valuables. You'll need your wits and your lasers!

With a host of features, including multi-directional movement, explosions, sound effects and one and two player option.

ZX MICRODRIVE





NOW ON RELEASE

The ZX Microdrive® System – as you'd expect from Sinclair – is unique to the world of computing. It's a compact, expandable add-on system which provides high-speed access to massive data storage. With just one Microdrive alone (and Interface 1), you'll have at least 85K bytes of storage, the ability to LOAD and SAVE in mere seconds, the beginnings of a local area network of up to 64 Spectrums, *and* a built-in RS232 interface! The cost? Less than £50 for each Microdrive.

How to get ZX Microdrive

Spectrum owners who bought direct from us, by mail order, have been sent full details. Order forms are being mailed in strict rotation, so if you haven't yet received your order form please bear with us. We're making good progress in meeting the huge demand.

If you didn't buy your Spectrum by mail order, don't worry. Send us the form from the bottom of this page. We'll add your name to the mailing list, and send you details by return.

Each Microdrive costs £49.95. Interface 1 costs £49.95, but just £29.95 if purchased with a ZX Microdrive. Extra ZX Microdrive cartridges: £4.95.

How to order

Simply fill in the relevant sections on the order form below. Note that there is no postage or packing to pay on some purchases. Orders may be sent FREEPOST (no stamp needed). Credit card holders may order by phone, calling 01-200 0200, 24 hours a day. 14-day money-back option, of course. Please allow 28 days for delivery.

sinclair®

Sinclair Research Ltd, Stanhope Road, Camberley, Surrey, GU15 3PS. Telephone: (0276) 685311.

ORDER FORM

To: Sinclair Research Ltd, FREEPOST, Camberley, Surrey, GU15 3BR.

Section A: Hardware

Qty	Item	Code	Item Price £	Total £
	ZX Interface 2	8501	19.95	
	ZX Spectrum – 48K	3000	129.95	
	ZX Spectrum – 16K	3002	99.95	
	Postage and packing: orders under £90	0028	2.95	
	orders over £90	0029	4.95	
			TOTAL £	

Section B: Software **ROM CARTRIDGE PROGRAMS**

	G12/R Planetoids	5302	14.95	
	G9/R Space Raiders	5300	14.95	
	G13/R Hungry Horace	5303	14.95	
	G24/R Horace and the Spiders	5305	14.95	
	G28/R PSSST	5307	14.95	
	G30/R Cookie	5309	14.95	
	G29/R Tranz Am	5308	14.95	
	G27/R Jet Pac	5306	14.95	
	G22/R Backgammon	5304	14.95	
	G10/R Chess	5301	14.95	

CASSETTE PROGRAMS for ZX Spectrum

E9/S	Chess Tutor 1	4308	9.95	
E7/S	Musicmaster	4306	9.95	
E8/S	Beyond BASIC	4307	9.95	
E6/S	Make-a-Chip	4305	9.95	
L5/S	Print Utilities	4404	9.95	
			TOTAL £	

*I enclose a cheque/postal order made payable to Sinclair Research Ltd for £

*Please charge to my Access/Barclaycard/Trustcard account no:

*Delete/complete as applicable.

Signature

Mr/Mrs/Miss

Address

SUS 911

(Please print)

ZX Microdrive information request

Please add my name to the Microdrive Mailing List, *and* send me a colour brochure with full specifications of ZX Microdrive/Interface 1 ☐ *(tick here)*. You can use the above form to send us your name and address.

Trapping the errors will ensure first-time running

THE FIRST error code encountered by most Sinclair users is the flashing "S" on the ZX-81 or "?" on the Spectrum, which indicates a syntax error in a sentence. Experience and the manual soon show that it is caused usually by typing-in a keyword letter by letter, or by bad punctuation, for example omitting a semi-colon or an inverted comma.

The most frequently-occurring error code is "2" — variable not found. A variable is a letter which has been given a numeric value. When you enter "LET a=2" you are defining a variable. Error code 2 results when the computer reaches a variable in the program to which you have so far given no value.

Check the line which the computer specifies. If it is your program, give a value to the variable or remove it. If you are copying the program, look back in the listing to see which line you have missed.

Although the majority of error codes are explained adequately in the manuals, the report "B-Integer out of range" can be confusing. An integer is a whole number — 1 is an integer, 1.5 and 1½ are not. That code occurs most frequently when you try to print something beyond the limits of the screen.

PRINT AT 0,31; "a" is acceptable and will print a letter "a" at the top right of the screen. PRINT AT 0,32; "a" would not be possible. The integer 32 would be out of range, resulting in error code "B". That would also happen if the computer were instructed to PRINT AT 0,31;"ab". It would still be trying to print a character beyond the limits of the screen.

That error is more difficult to detect if variables have been used as co-ordinates and your character, or series of characters, is being printed in varying positions. If the instruction PRINT AT 0,x;"a" produces report code B, make sure that the value of x never increases beyond 31.

On the Spectrum "B-integer out of range" is also often found when you are POKEing-in user defined graphics. The biggest number which can be POKEd-in this case is 255 or BIN 11111111. In that case the error code will occur in the line containing the POKE statement. In most cases, though, the error will have occurred in one of the DATA lines in the program.

A very frequent error code produced on the Spectrum is "E-Out Of Data". That will occur in a line containing a READ statement. The error code, though, will have occurred in one of the program DATA lines, which may be nowhere near the READ line. A READ command sends the computer to a DATA line to collect the next piece of DATA contained there. That is often done using a FOR, NEXT loop, especially when graphics are being set up.

FOR n=1 TO 8: READ n will send the computer to the DATA lines eight times, for eight separate pieces of information. If there are only seven pieces of DATA there it will return to the READ line and produce the code OUT OF DATA. When there are several DATA lines they will all have to be checked, because the piece of DATA you have omitted was not necessarily the last.

In some cases the computer will follow the program correctly, without producing an error code, but from the programmer's point of view the program contains an error. In that case BREAK into the program at the moment it goes wrong. That will produce report code 9 and the line on which you have STOPped the program. That method makes it easy to locate the area of the program which contains the error.

Programs which you copy from magazines, books or from friends can be difficult to error-trap because they contain programming techniques which you have not yet learned, or simply because it is often difficult to follow another programmer's logic.

The flashing "S" or "?" indicating a syntax error may appear frequently. In that case check carefully what you have copied. You may not have recognised words such as LN or EXP as keywords.

On the ZX-81 especially it is easy to forget that pressing "π" will produce the word PI.

Make sure that when the "is not equal" sign, "< >" appears in a listing you always enter it as one character and not as "is less than", "<" followed by "is greater than", ">".

Technical problems can also cause errors in programs. Any alteration to the power supply can cause a program to CRASH. In that case the screen display may change dramatically and using the keyboard will have no effect. The only solution is to unplug your computer and begin again, making sure that your power supply and RAM pack are both connected firmly. That error is caused by the computer and not by the program.

> 'The error need not be on the line which produces the report; that is simply the line where the computer meets the problem'

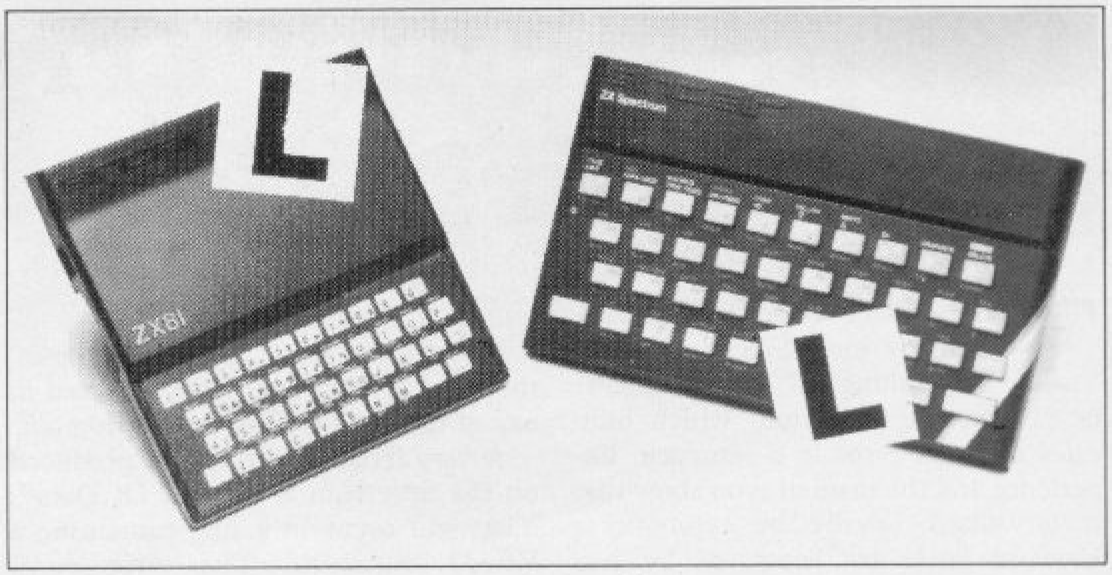
Sometimes a program listing in a book or magazine will contain what seems to be a very obvious error. If it contains key words or symbols which are not on your computer, check that it is intended for your machine. Programs for the Spectrum, the ZX-81 and the ZX-80 are not usually directly interchangeable. If a program contains the command GOTO or GOSUB — a non-existent line number — the computer will simply go to the next numbered line after that one. That is a sign that a program has been developed and improved and is rarely an error.

When you have errors in a program, first check the report codes listed in Appendix B of the manual. It may then be necessary to read the appropriate section of the manual. Remember that the error is not necessarily on the line which produces the report code; that is simply the line where the computer meets the problem for the first time.

Always check carefully every line connected with the line containing the error code and the mistake should be easy to locate.

GLOSSARY

Basic — Beginners' All-purpose Symbolic Instruction Code. A programming language resembling English which is used by beginners because most popular microcomputers have it as standard.
Bug — an error in a program.
EPROM — Erasable Programmable Read-Only Memory. Semi-permanent storage. Information is not erased if the power is turned off in the computer. Programs can be erased by subjecting the memory chips to ultra-violet light. The memory can then be re-programmed using an electrical device called an EPROM blower.
Interface — RS232 and Centronics. A device which enables other computers or add-ons, such as printers, to be connected to the computer. It converts non-standard signals from add-ons to the standard signals of the computer in use.
Kilobyte — (K). A measurement of memory size. Most machines use 16K as a minimum but 48K is generally agreed to be necessary for serious work.
Machine code — an electronic pulse code used by the computer to perform functions and communicate with memory and other devices.
Mnemonics — abbreviated instructions — for example LD for Load — used in machine language programming.
Motherboard — an external printed circuit board which is used like a multi-way plug planner. It enables other printed circuit boards, such as graphics boards and colour boards, to be slotted-in.
Port — a link to the outside world which can be used by programs and the computer.
PCB — printed circuit board. A board which has on it the electronic circuits of the computer.
RAM — Random Access Memory. Information and programs can be stored in this type of memory as electronic pulses which conform to a set of numbers — machine language — in which programs are represented in the computer. When the power is turned off the information will be lost.
ROM — Read Only Memory. Information stored in this type of memory is not lost when the power is switched off.
Software — programs which control the operation of the computer.
Syntax error — a bug caused by incorrect use of a programming language.



Our easy-to-follow guide for new owners

The basic route to a habit-forming hobby

BUYING a Sinclair machine can be the start of a life-time's obsession with home computing. It is easy, however, to become discouraged if everything does not go according to plan from the beginning.

For those with only a little knowledge of computers and their capabilities, the best way to approach the machines is to abandon any ideas for special uses. While the 48K Spectrum is big enough for simple uses in small businesses, the range of Sinclair computers does not contain machines for major uses. It is better to become accustomed to the many facilities and then decide how you wish to use them.

Begin by unpacking your machine, overcoming your surprise at its size and weight and, following the manual, set up the system. If you cannot get the K on the screen, check that everything is plugged into its correct socket and re-set the machine by pulling-out the power plug for one second and try tuning-in again. If still nothing appears, check the power supply unit by shaking it. If it rattles, return it. If it is satisfactory, check your system with that of a friend.

If you have a Spectrum you will have received an introductory booklet which explains what the computer can do and giving detailed instructions on how to set it up. Also included is a fault-finding guide.

Once the K appears you are ready to begin learning about your machine. It can prevent family arguments if you can afford a separate television set for your system. It also makes life easier if you find somewhere to leave your equipment set up permanently. You will find that a few power sockets are needed and a four-way block connector on a short length of extension cable will help to tidy trailing leads.

When using a Spectrum, a television set has to be more finely-tuned than when using a ZX-81 because of the added dimension of colour. If the set is not tuned properly, the colours will look hazy instead of sharp and clear. If no colour can be seen when it is switched on, the power supply or the television set may be at fault.

Some users have experienced some difficulty with some television sets, which include Hitachi, Grundig and Toshiba. Sets which many people have found compatible include the Sony Trinitron, Fidelity and Ferguson. Recent changes in the ULA should make more sets compatible.

The manuals are written in great detail and are reasonably easy to follow. Some of the chapters may not seem immediately relevant but it is worthwhile reading them as you might miss something important.

Patience is needed at that stage to learn the ways in which the computer will accept information. It is tempting to try to enter programs before you are ready but that is likely to lead to errors. For example, words like AND, THEN and AT should not be typed-in letter by letter.

By the time you have reached chapter 11 in the ZX-81 manual and chapter 19 in the Spectrum manual you should have accumulated sufficient knowledge to be

continued on page 141

continued from page 140

able to type-in other people's programs, such as those in *Sinclair User* and *Sinclair Programs*, without too much difficulty.

It is important when using the ZX-81 that it is not jolted. Some of the connections can easily work loose and everything which has been entered will be lost.

The manuals are not to everyone's liking and if you find them difficult to follow a number of books on the market can help you. Find the one which suits you best.

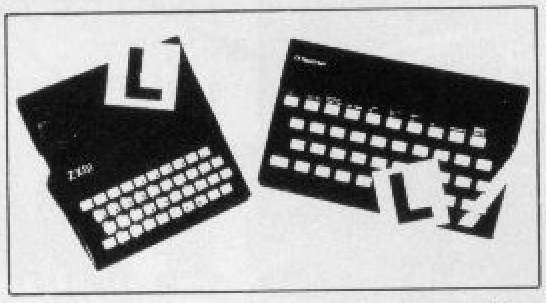
As a way of relaxing you can buy some of the growing range of commercially-produced software. That can be loaded directly from cassette but make sure that your machine is big enough to take the tapes you buy.

For the ZX-81 there are a few tapes for the unexpanded 1K machine but the majority require the 16K RAM pack. Similarly on the Spectrum most companies are taking advantage of the possibilities provided by the larger 48K machine rather than providing cassettes for the 16K.

The tapes can vary in quality and it is advisable to read the reviews in *Sinclair User* and use your judgment to find the best.

An alternative method to learn about both the ZX-81 and the Spectrum is to plunge in at the deep end and see what the machines will do. Refer to the manuals when you have difficulties. You can ignore the functions and calculations initially and experiment with PRINT statements to obtain the feel of the machines.

You may already have heard about the problem involved in SAVEing and



LOADing your own cassettes. The manual gives detailed instructions but many of the early ZX-81s would not accept tapes from some recorders. That problem is said to have been overcome but there can still be difficulties.

Usually they occur when LOADing tapes recorded by other people. One simple method to overcome this is to wind the tape to the middle of the program and type LOAD " " followed by NEWLINE; then increase the volume of the recorder slowly with the tape running until the television screen shows four or five thick black bands. If you then re-wind the tape, the program should LOAD normally.

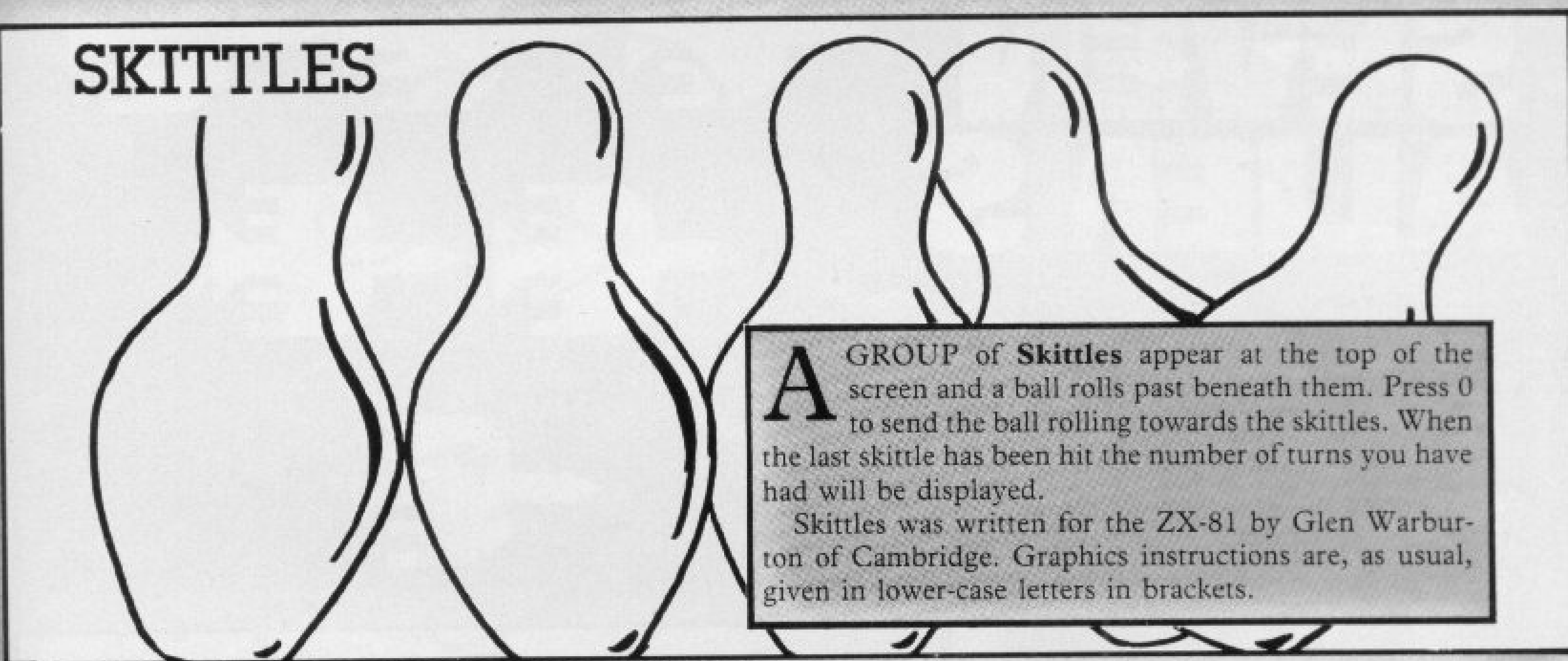
LOADing and SAVEing on the Spectrum is much easier and faster than the ZX-81. One difference is that when SAVEing on the Spectrum the LOAD lead must be disconnected either at the recorder or the Spectrum.

Finally, a health warning. Apart from any practical uses, computing with your Sinclair machine can be a very entertaining hobby and is almost certainly habit-forming. You may easily find yourself crouched over your machine, red-eyed, in the early hours of the morning thinking that in another five minutes you will solve the problem. Try to break that habit by getting into the fresh air and meeting other Sinclair users.

By obtaining a Sinclair computer you find that you have joined a not very exclusive club with many thousands of members, many of whom would be only too happy to advise you if you have difficulties.

Make sure of your regular copies of *Sinclair User* and *Sinclair Programs* and you can be guaranteed many happy hours.

SKITTLES



A GROUP of **Skittles** appear at the top of the screen and a ball rolls past beneath them. Press 0 to send the ball rolling towards the skittles. When the last skittle has been hit the number of turns you have had will be displayed.

Skittles was written for the ZX-81 by Glen Warburton of Cambridge. Graphics instructions are, as usual, given in lower-case letters in brackets.

```
  5 LET I=CODE " "
  6 LET O=I
 10 PRINT AT CODE " ",CODE " ";
"(1sP'sP'1sP'2*sP'1sP'2*sP'1sP's
P'1sP)"
 20 PRINT AT CODE "(92)",CODE "
";"(sP'1sP'sP'1sP'sP'1sP'sP'1sP
'sP'1sP)"
 30 PRINT AT CODE "(94)",CODE "
";"(1sP'sP'1sP'2*sP'1sP'2*sP'1s
P'sP'1sP)"
100 FOR D=CODE " " TO CODE "?"
110 PRINT AT CODE "£",D;"(1sP)"
;AT CODE "£",D;" "
120 IF INKEY$="0" THEN GOTO 200
130 NEXT D
135 LET I=I+CODE "(91)"
140 GOTO VAL "100"
160 LET O=O+CODE "(91)"
164 PRINT AT H,D;" "
165 IF O<CODE "?" THEN GOTO VAL
"100"
170 PRINT AT CODE "(9s)",CODE "
";"DONE IN ";I;" GOES"
190 STOP
200 FOR H=CODE "£" TO CODE " "
STEP VAL "-1"
205 PRINT AT H,D;
220 IF PEEK (PEEK VAL "16398"+V
AL "256"*PEEK VAL "16399")=CODE
"(1sP)" THEN GOTO VAL "160"
225 PRINT AT H,D;"(1*)";AT H,D;
" "
230 NEXT H
239 LET I=I+CODE "(91)"
240 GOTO VAL "100"
```

SPACE PROJECT SATURN

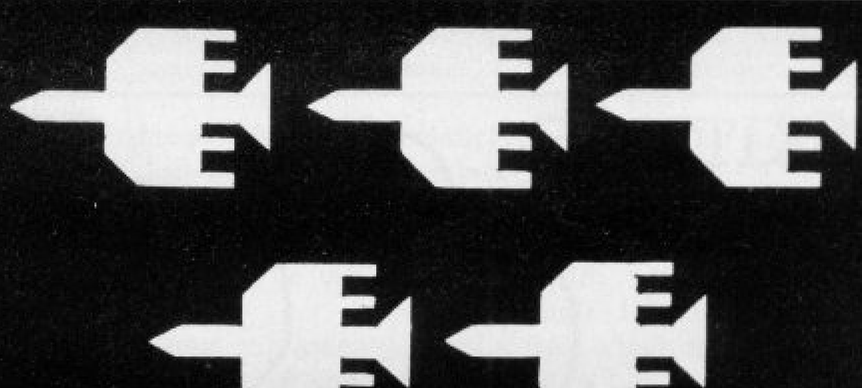


STEER YOUR spacecraft through Saturn's rings and dock at the space station on the right of the screen. Move up and down with keys 6 and 7.

Written for the ZX-81 by Alison McMillan of Dumfries.

```
 10 LET Y=PI-PI
 20 LET S=Y
 30 LET F=INT (RND*19)
 40 LET A=INT (RND*21)
 50 LET Y=Y+1
 60 FOR B=F-F TO 26
 70 CLS
 80 PRINT AT 9,15;"(96)"
 90 PRINT AT 12,15;"(97)"
100 PRINT AT F+2,31;"(1sP)"
110 PRINT AT F,31;"(1sP)"
120 LET A=A+(INKEY$="6")-(INKEY
$="7")
130 PRINT AT A,B;">0(9h)0>-"
140 IF A<>10 AND A<>11 AND B>8
AND B<16 THEN GOTO 169
150 NEXT B
160 IF A=F+1 THEN GOTO 209
170 PRINT AT 0,6;"YOUR SCORE RE
MAINS ";S;
180 PRINT TAB 6;"NUMBER OF ATTE
MPTS ";Y;
190 PAUSE 4E4
200 GOTO 30
210 LET S=S+1
220 PRINT AT 0,7;"YOUR SCORE IS
 NOW ";S;
230 GOTO 179
```

SEVEN ALIENS





SEVEN ALIENS will fly across the screen from left to right. Fire from the right of the screen with 0 and from the left with 1. As your guns cannot be moved your shots must be timed precisely to hit all seven.

Written by Conor Brophy of Dublin for the ZX-81.

```
  1 REM "S"
  2 LET I=PI-PI
  3 LET O=SGN PI
  4 LET F=SIN PI
  5 CLS
  6 LET I=I+O
  7 IF I=8 THEN STOP
 10 LET A=INT (RND*VAL "12")+9
 15 FOR Z=F TO VAL "31"
 16 PRINT AT A,Z;"(1 )"
 30 IF INKEY$="1" THEN GOTO VAL
"300"
 40 IF INKEY$="0" THEN GOTO VAL
"200"
 41 PRINT AT A,Z;" "
 45 NEXT Z
 50 GOTO VAL "10"
200 LET B=VAL "63"
205 FOR A=F TO VAL "25"
210 PLOT B,A
215 UNPLOT B,A
220 LET B=B-O
225 NEXT A
230 GOTO VAL "5"
300 LET B=F
315 FOR A=F TO VAL "25"
320 PLOT B,A
325 UNPLOT B,A
330 LET B=B+O
335 NEXT A
340 GOTO VAL "5"
```



CHARACTER ENLARGER

CHARACTER ENLARGER, written for the Spectrum by I Richards of Dover, Kent will enlarge any four letters or characters you choose. When the program has been entered and RUN, enter the four letters of your choice. They will be printed at the bottom of the screen and their enlarged versions will appear at the top.

```
  10 INPUT "CHR ";a$: IF LEN a$>
4 THEN GO TO 5
  20 FOR x=0 TO LEN a$+LEN a$*5
  30 PRINT AT 21,0;a$
  40 FOR n=0 TO 7: FOR z=0 TO 7
  50 LET a=POINT (n+x,z)
  60 IF a=0 THEN PRINT AT z-8,n+
x;" "
  70 IF a=1 THEN PRINT AT z-8,n+
x;"(1sP)"
  80 NEXT z: NEXT n: NEXT x
  90 PRINT AT 21,0;"    "
 100 INPUT "PRESS ENTER TO RUN A
GAIN ";z$: RUN
```

snake



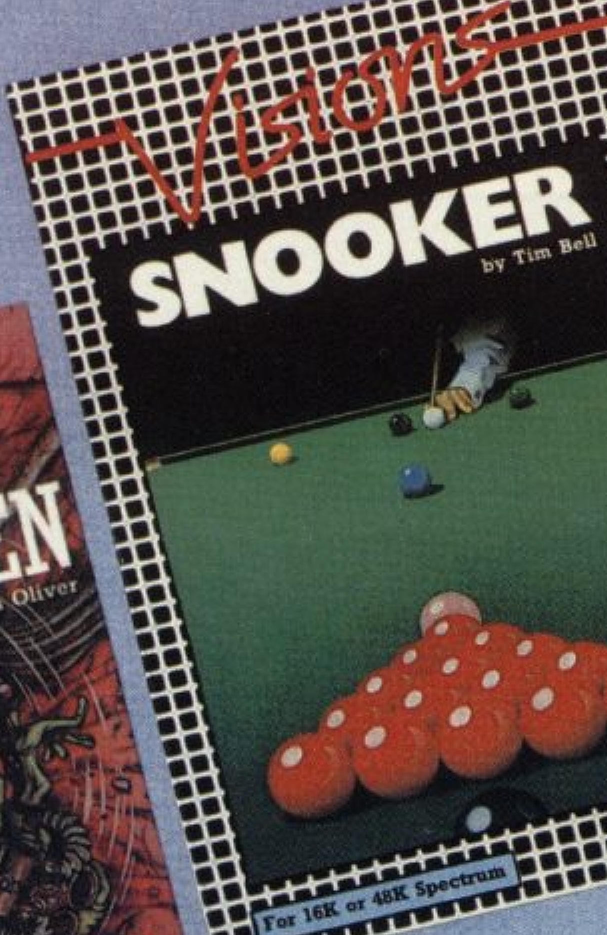
BLUE, GREEN and magenta squares are scattered across the screen. Blue squares are worth 10 points, green are worth 20 and magenta worth 30. Using the usual cursor keys, hit each square once, first all the blue ones, then all the green, and finally all the magenta ones. Once you have hit a square it will turn white. You must touch nothing white—not your trail, white squares, or the edge of the playing area.

Snake was written for the 16K Spectrum by Kristofer Gamstedt of Erebro, Sweden.

```
  10 PAPER 0: BORDER 0: CLS
  20 RANDOMIZE : DEF FN s(x,y)=1
0*(6-ATTR (INT ((175-y)/8),INT (
x/8)))
  30 PRINT AT 0,10; INK 7; PAPER
 2; FLASH 1;"*** SNAKE ***"
  40 INK 7: PLOT 0,167: DRAW 255
,0: DRAW 0,-159: DRAW -255,0: DR
AW 0,159
  50 FOR f=1 TO 40: LET c=INT (R
ND*3)+3: LET a=INT (RND*17)+2: L
ET b=INT (RND*27)+2: PRINT AT a,
b; INK c;"(1sP)": NEXT f
  60 PRINT AT 10,14;"   ": LET
x=112: LET y=88: LET a$="8": LET
 p=0: LET p1=0: LET p2=0: PRINT
AT 21,11;"SCORE="
  70 PLOT x,y
  80 LET b$=INKEY$: IF b$="" THE
N LET b$=a$: GO TO 100
  90 LET a$=b$
 100 LET x=x+(b$="8")-(b$="5"):
LET y=y+(b$="7")-(b$="6")
 110 IF POINT (x,y)=0 THEN GO TO
 70
 120 IF FN s(x,y)=-10 THEN GO TO
 170
 130 LET p1=FN s(x,y): IF p1>=p2
 THEN LET p2=p1: LET p=p+p1: PRI
NT AT 21,17;p: BEEP .03,10: GO T
O 140
 135 GO TO 170
 140 PLOT x+(4 AND b$="8")-(4 AN
D b$="5"),y+(4 AND b$="7")-(4 AN
D b$="6")
 150 LET x=x+(8 AND b$="8")-(8 A
ND b$="5"): LET y=y+(8 AND b$="7
")-(8 AND b$="6")
 160 GO TO 70
 170 BEEP 2,-10: INPUT "GAME OVE
R! ANOTHER GO?";a$: IF a$(1)="y"
 THEN GO TO 10
```

ALL THE BEST FO

Here's a sure-fire way of making certain this Christmas is packed full of fun for you and your friends. We've searched for brilliant new program sources throughout the U.K. and North America to find an exciting collection of new games — and business programs — many of which cannot be bought by mail order from any other source! These are our latest exclusive offerings. Make sure you place your order now to receive them in time for Christmas.



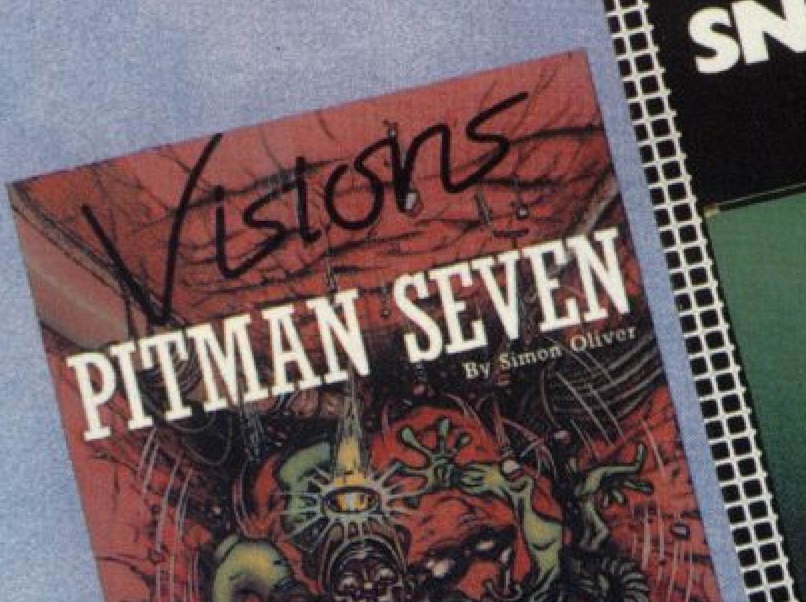
SNOOKER

Visions Snooker brings all the excitement and all the tension of big time tournaments to your TV set.

With an advanced program written by a 19 year old undergraduate at Queens College Cambridge, it makes Pot Black look like a load of old balls. Visions Snooker for the 16K ZX Spectrum. It's an exciting test of your skills on the cue.

Cassette price: £8.95.

Ref. No: 2-53





PITMAN SEVEN

Your mission is to rescue two teams of seven desperate men, trapped underground on level five. You must bring each man to the surface, surviving the dangers you meet en route.

ZX Spectrum 48K.

Cassette price: £6.95.

Ref. No: 2-52

FREE BLANK C15 CO
WITH EVERY TWO CAS

Remember there's no lim
cassettes you receive if you
why not get together wi
members and sh

GREAT VALUE! TREMENDOUS SELECTION! PLUS A FREE OFFER EVERY TIME!

Fill in the order form right away — we're guaranteeing fast delivery, quality and satisfaction (after all, we want you to come back for more!)

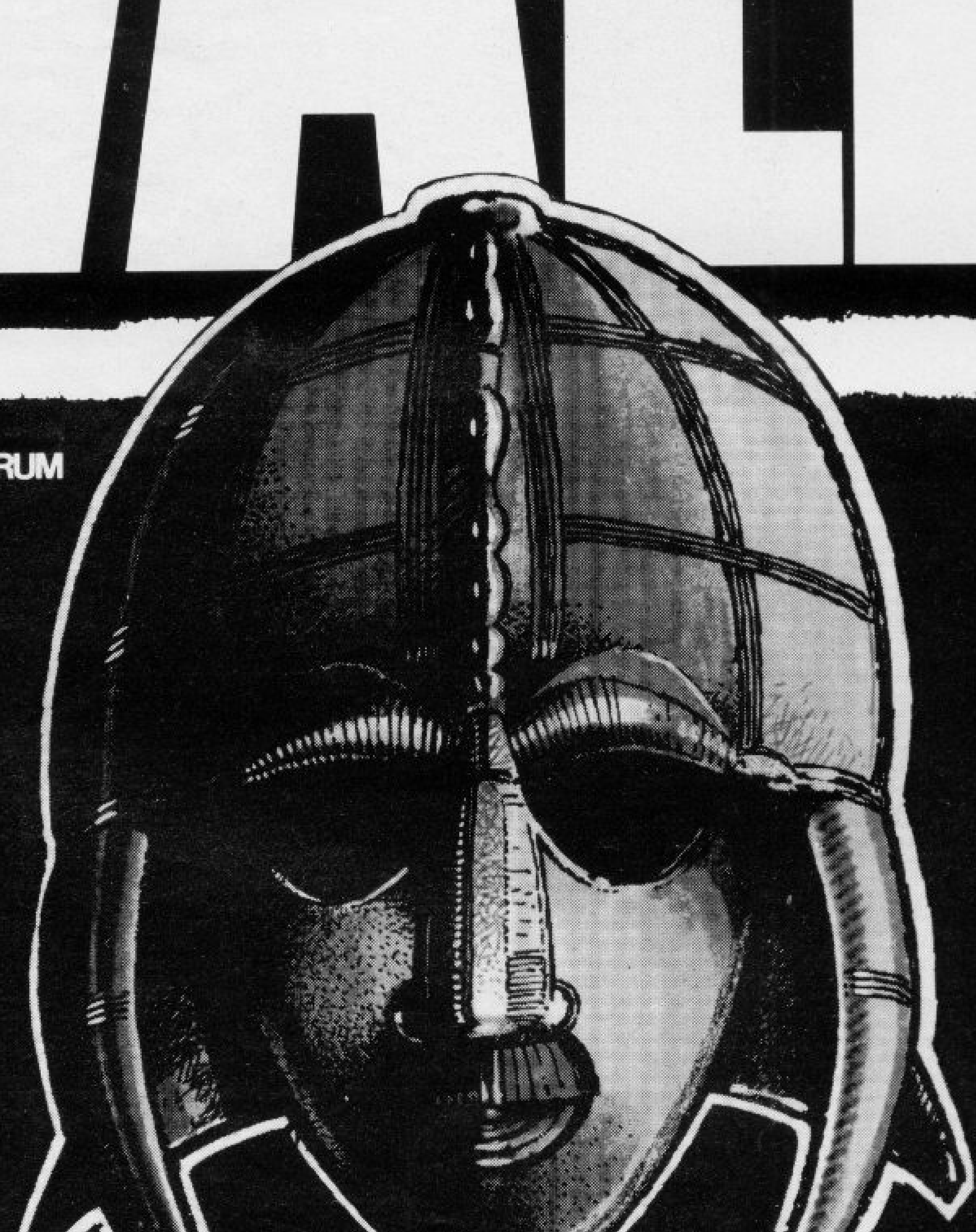
The Software Workshop, Yew Tree, Selborne, Hants GU34 3JP

GUARA

Order with complete c
not entirely satisfied
your purchase retu
days and we will pro

VALH

48K SPECTRUM



ALLA

MOVi SOFT ©

LEGEND

VALHALLA is supplied on a 48K Spectrum program cassette, with VALHALLA player manual and presentation box. As VALHALLA uses the full 48K RAM, microdrives and full-size printers are not supported. ZX printer optional.

VALHALLA is normally available from stock, and orders are despatched by return. If, for any reason we are unable to fulfil your order within 14 days of receipt, we will notify you.

VALHALLA cassettes carry an unconditional lifetime replacement guarantee.

TO ORDER: (UK Orders Only) Simply complete the coupon, and FREEPOST with your cheque/P.O. made payable to LEGEND (UK Mail Order).

Credit Card Orders: By phone 9-5.30 Mon to Fri. stating name and address, Card No. and item(s) required.

RETAILERS: Please contact your regular distributor or LEGEND (Trade Distribution) at the address below.

LEGEND (UK Mail Order) FREEPOST
1 Milton Road, Cambridge CB4 1UY
(0223) 312453

MOViSOFT OPERATING SYSTEM UNDER LICENCE.

Post to:- LEGEND (UK Mail Order) FREEPOST
1 Milton Road, Cambridge CB4 1UY
Please send me............................Copy/copies of
VALHALLA for the 48K Spectrum.
I enclose cheque/P.O. for £............
(£14.95 each incl. VAT and P&P)
SU11
Or I wish to pay by Access/Barclaycard/Visa
Card No...
Please print name and address
Name..
Address...
....
....
Credit Card holder's signature..........................

Quentin Heath goes in search of gold nuggets in Greedy Gulch with an unusual bunch of adversaries

Beginners' adventure in the wild west

MANY ADVENTURE games contain fierce adversaries such as vampires, werewolves and slugs. **Greedy Gulch,** however, contains none of those and the only adversaries with which the player has to contend are natural hazards such as the desert and an unstable mine shaft.

It would be helpful if I detailed a complete list of the objects you have to find but this month I will give you only some gentle nudges in the proper direction, as Phipps Associates, the manufacturer of the adventure, has informed me that it is for beginners. All Hobbit-hardened players should have no problems.

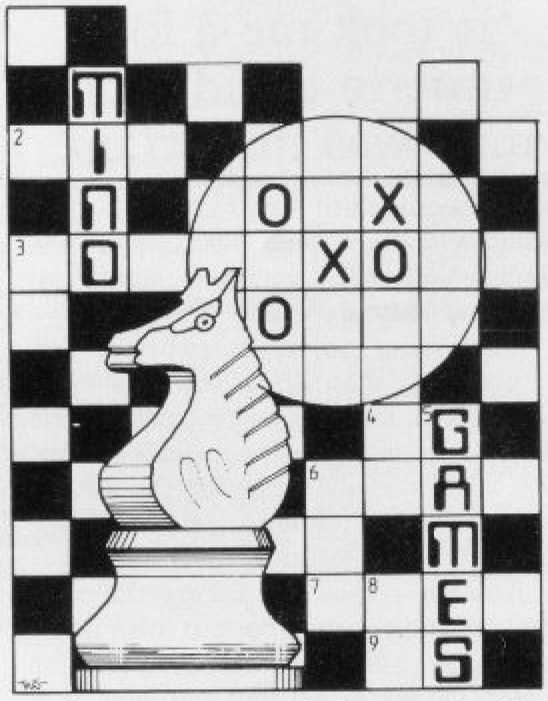
An incomplete inventory of objects includes a gun, a lamp, some matches and a hat. All those items make sense with the object of your quest a nugget in the gold mine located in the centre of a vast desert.

As the town is the focal point of the game you have to start in the main street, where you should be able to see the sheriff's office and the hotel. Make sure that you visit all locations, especially the hotel lobby.

The decor of the lobby may not be interesting but you should walk to the reception desk, which is deserted, and look at the register. You will find something interesting in it. That vague clue may not offer you much help but I can assure you that when you have wandered round the town for several turns the name you find at the hotel will click into place and provide you with a clearer picture of what you are trying to do.

Your encounter with the register in the hotel should give you some idea of how objects have been spread logically around the locations of the adventure. I have given a brief list of some of the objects which can be found in the town.

Pairing the locations which the computer will give you either on the graphic displays or from the text below them on the screen, you should be able to tell where the other objects are located. For instance, you might find some kind of weapon in the sheriff's office and



another more practical one in the blacksmith's forge.

You will soon become adept at collecting objects but do not be lulled into a false sense of security when the computer tells you that you cannot pick up any more items. There is an object in almost every location and that is more than you can carry.

The best way to collect all objects is to pick them up from the individual locations and carry them to the outskirts of the town where the desert begins. You must have every item or you could lose your way in the desert or be thirsty. Both events mean certain death.

I have noticed that many adventurers take objects and do not appreciate that they could be connected with other items which will be found in the game. There is reluctance to return to places which have already been visited but Greedy Gulch will teach you that in some cases it is necessary.

> 'Your encounter with the register in the hotel should give you some idea of how objects have been spread around locations of the adventure. Pairing locations will help find the objects'.

There are at least three objects linked with each other in the game and because the adventure is for beginners they are all easily linked when you have found them. The only clue I will give as to the items is that they should keep you enlightened during the game, even if they do not keep you cool in the desert.

The language structure of the program is simple and, as a result, communication with the computer is easy. Like most early adventures the program uses the word pattern of verb followed by an object. It will respond quickly to commands such as GET AXE but has difficulty with conjunctions such as AND.

The best approach is to think of the easiest way of saying something; never ask a question and keep your commands within the context of the situation in which you are playing. By observing those rules you will waste less time.

Greedy Gulch is an adventure in which the number of turns you take is important. That does not mean that you have to finish the adventure within a number of turns but to act a certain number of times. For instance, you may get nothing out of the pump in the centre of the ghost town for two turns. You need to crank the handle of the pump a few times before anything will happen. If you do not you will look like a drip.

Once you have water and all the weapons and objects you need, you can prepare to leave town and go into the desert where, after much searching of the soul — and searching for water — you will find the mine.

If you have not picked up all the items in the town, or if you have missed the vital item, you will land in an area

from which you cannot escape. The desert will claim you. The object you must have in your possession when you jump over the ravine is something which will show you the way. It is easy to become lost if you forget it.

If you are lost in the desert and you are not in the place of no return, there is a simple way out of your dilemma. The only thing you can lose if you fail in your attempt to get back to the orginal location is one of the carefully-collected objects.

Drop an object at your present location. From there you should try to go in a circle. If you cannot go one way, try the other. At some point, two moves after you dropped your object you should arrive back at the location of the item. From the centre of the desert you must go south and then west to reach the cave. With the knowledge of the circular direction which you took and the number of turns which you needed to get back to the object which you dropped you should be able to determine where you are.

If you are still having difficulty the computer will give you a hint about the general direction in which you should go. I see no harm in letting you know this now, so what you should do is look at Zeek's map. That will not give you the complete answer but it will point you in the general direction of the mine.

You may still be wondering how to carry all those objects around with you on your back when there are at least two objects you cannot carry.

To take all the objects to the desert you must make some trips back to town. I can assure you that there is a way back, even though it is along a winding kind of route. When you get back, pick up your objects and jump across the ravine again until you reach the place where you have been hoarding all the items. You will have to make several trips but they are worth your while.

'It took me a long time to decide the map was important'

One object not to drop before you return is the map which you must have to get back into the correct part of the desert. Do not make the mistake I made several times when playing the adventure; it took me a long time to decide that the map was important.

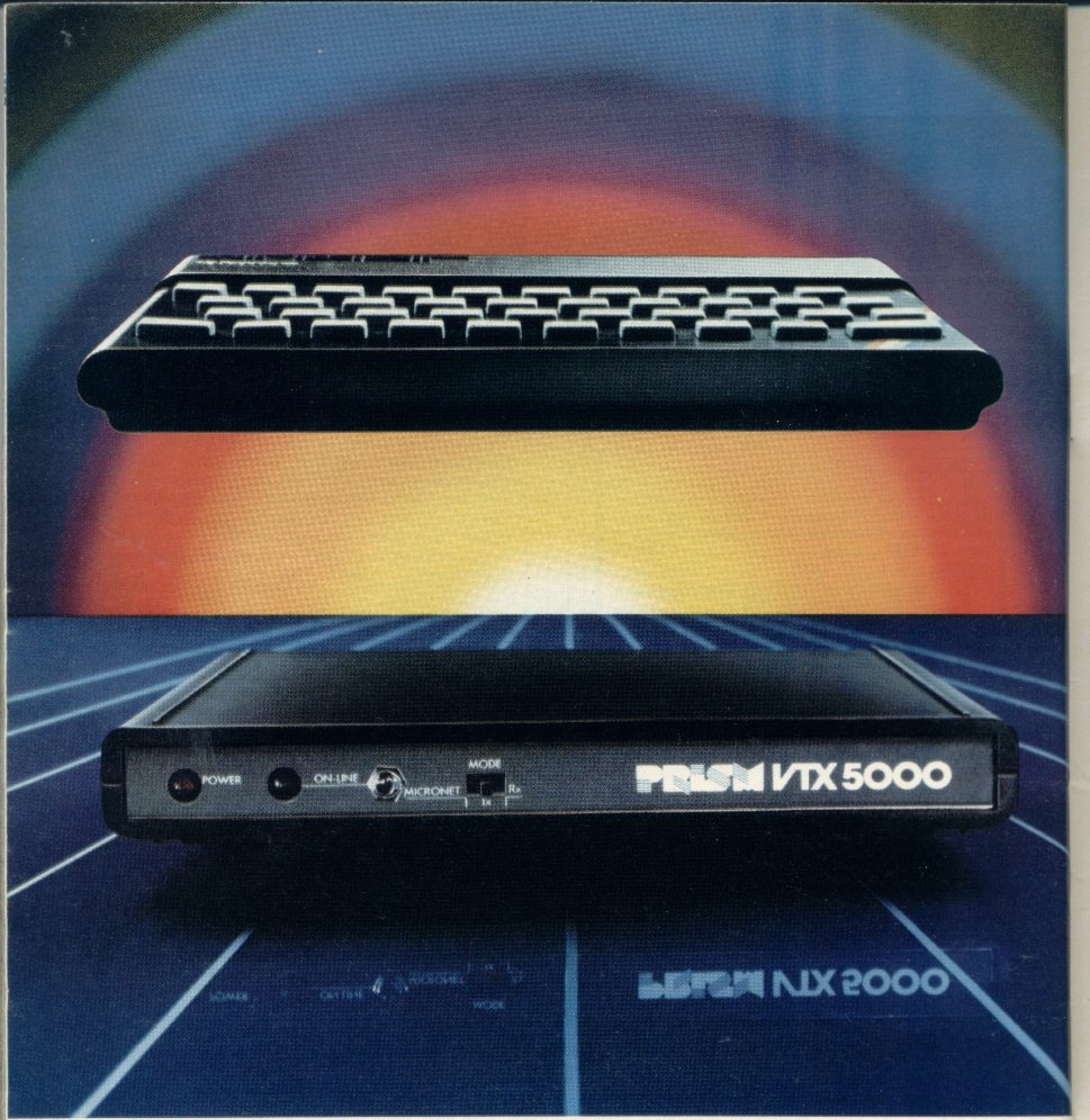
Another reason for taking the long route from the desert back to town is the need, by your player-character, for water. Do not forget that you have only a small bottle of liquid and you will need that after several steps into the desert. You should be called upon only once to drink water. If the computer asks you more than once you have either been very unlucky or have been going round in circles. The best way to solve that problem is to find an oasis which you should reach if you are on the correct track for the mine.

Your encounter with the entrance to the mine will be sudden. Do not jump in immediately or you could die very quickly. The mine has only two or three locations to it but they are dangerous. You will need at least one of the weapons you collected in town before you pass on to find out the meaning of the Adventurer's Delight.

Phipps Associates provided me with a map to help with the adventure. That, however, provided more problems than it solved, so the clues I have given are more from experience than from cheating with a reviewer's prop.

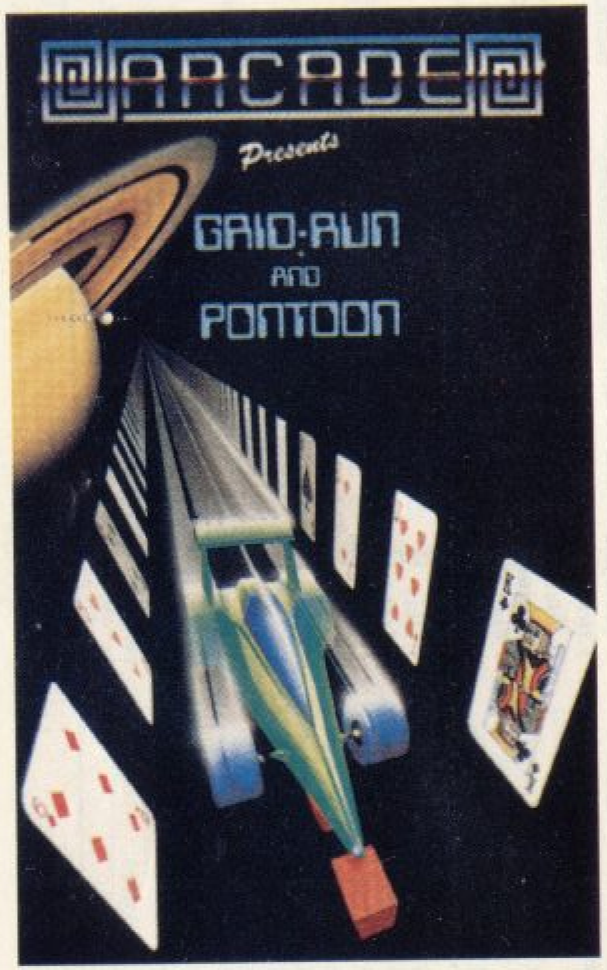
The game is difficult and provided me with hours of frustration. I was very close to finishing, only to find that at the last location a nasty-looking reptile appears from nowhere.

Next month I will be in festive mode, looking at some mind games you might like for Christmas.

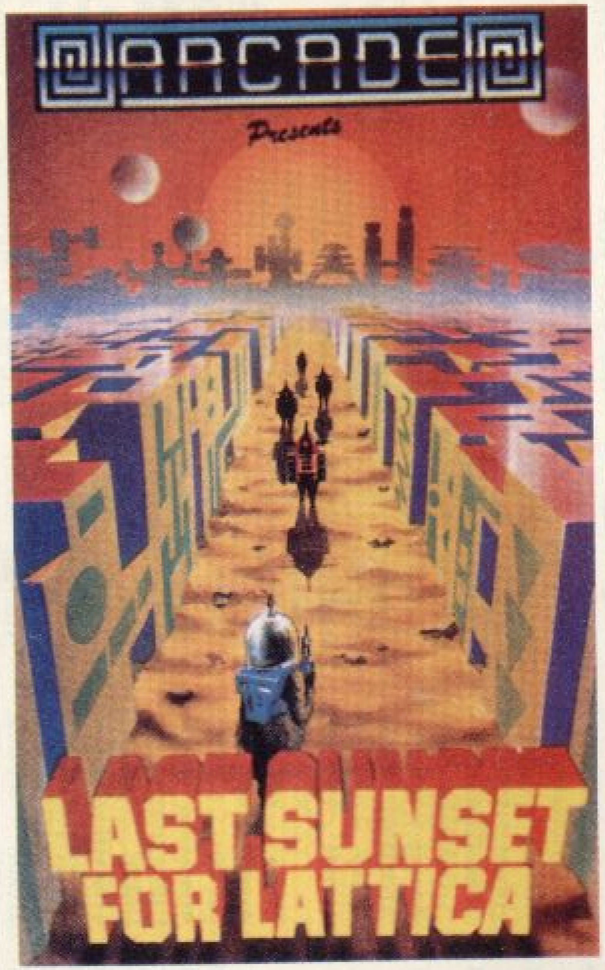


offers the most sp
under the Spec

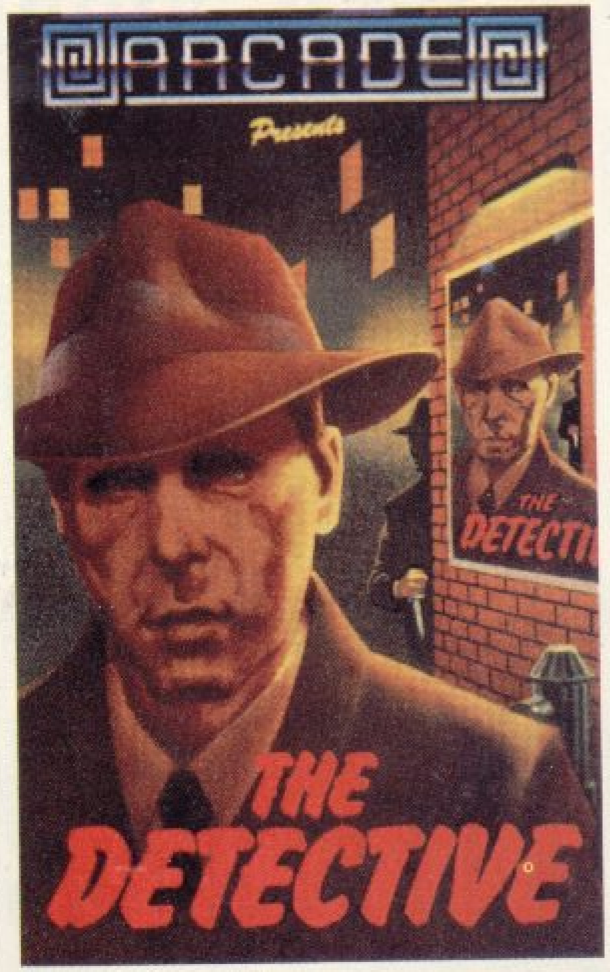
THE ARCADE COLLECTION



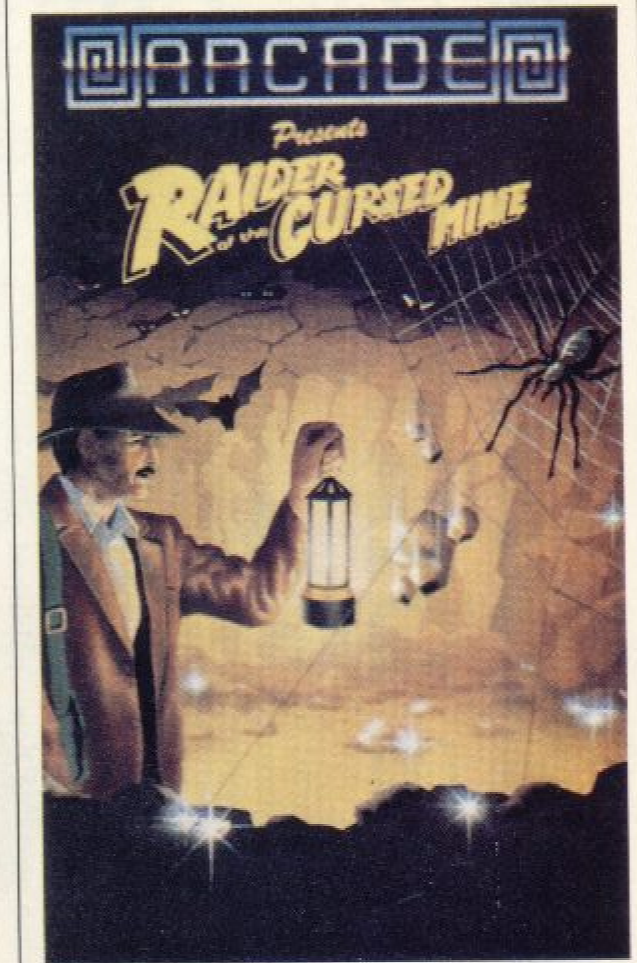
GRID RUN is a high resolution, fast machine code game using the spectrums sound and colour to the full. Set in a maze you must avoid oncoming android cars bent on your destruction. Bonus car every 10,000 points "Famous Five" hall of fame, increasing speed and difficulty. There is even a hold button to get your breath back. **PONTOON** included on side B absolutely free. Pontoon has full graphical representations of all the cards including King, Queen, Jack, "Intelligent" play of aces, and full analysis of results at end of each game. REF. GRID.



LAST SUNSET FOR LATTICA (Original) is a true graphical adventure game in real time. Your aim is to defuse a bomb hidden somewhere in a highly complicated maze avoiding many well armed androids along the way. Extra lives are there for the taking, so are the keys to take you to the next level and all the while time is running out for the little Planet of Lattica. REF. SUN.



THE DETECTIVE (Original) You thought it was just another "Take the secrets from a Safe and Run" job but the mob thought differently. They will try everything to stop you this time, if madmen, lasers, bombs, dynamite, daggers, barrels, blister bombs, crates, helicopters, jets and fourteen other levels do not get you, you might just make it. Opening the safe has its pitfalls too. Fast moving, m/c game with excellent graphics and sound. A very addictive game. REF. DET.



RAIDER OF THE CURSED MINE (Original) Greed drove you down into the old diamond mine, sheer determination and luck is the only way out again. Lifts help you, so do lamps, and diamonds can be worth a fortune but beware of the evils that lurk deep in the mine. Trolls who throw boulders at you, spiders who eat you, ghosts who show no mercy and bats who steal things, add to this a time bonus and you have an exciting Arcade quality game. Reach level 32 and escape to the big outside world. REF. RAID.

All these games are available for the ZX Spectrum 48K for the incredible price of only **£5.50** including P&P VAT etc. Just complete the mail order form for prompt dispatch by return of post.

Arcade are committed to original game concepts so look out for new titles in the Arcade range. Trade enquiries welcome. Phone Orpington 35639 anytime or write to Arcade Software Ltd, Technology House, 32 Chislehurst Road, Orpington, Kent BR6 0DG.

TO: ALL MAIL ORDERS

Qty.	Item	Item Price £	Total £

DON'T FORGET YOU CAN ALWAYS ORDER ON THE TELEPHONE WITH YOUR CREDIT CARD. TRADE ENQUIRIES WELCOME.

*I enclose a cheque/postal order payable to *ARCADE SOFTWARE LTD,* for £.................. *Please charge to my Access/Barclaycard account no.

*Please delete/complete as applicable.

Signature ____________

Name: Mr/Mrs/Miss ____________

Address ____________

SU2

SOFTWARE DIRECTORY

OUR NEW software listings service has been welcomed by readers. This month, and from now on, we are publishing the full list, updated with the latest releases such as Maziacs from dK'Tronics and Spectipede from R and R.

If we have reviewed a cassette we shall give it a rating known as the Gilbert Factor, named after our software editor John Gilbert. Although the final figure is out of 10 it is the result of a complicated calculation involving a number of factors which are taken into account when assessing how good a cassette is.

The factors include value for money, the layout of the screen instructions, conciseness of the program and its speed of operation, the accomplishment of the task it aims to achieve, the innovation of concept, and the use it makes of the machine.

While trying to ensure that all software is dealt with it is inevitable that some will be omitted. We will remedy any omissions later. Lack of space means that we cannot publish the complete list in one issue. The remainder of the list will be published next month and we will repeat this month's one month later.

Any suggestions for its improvement will be welcomed.

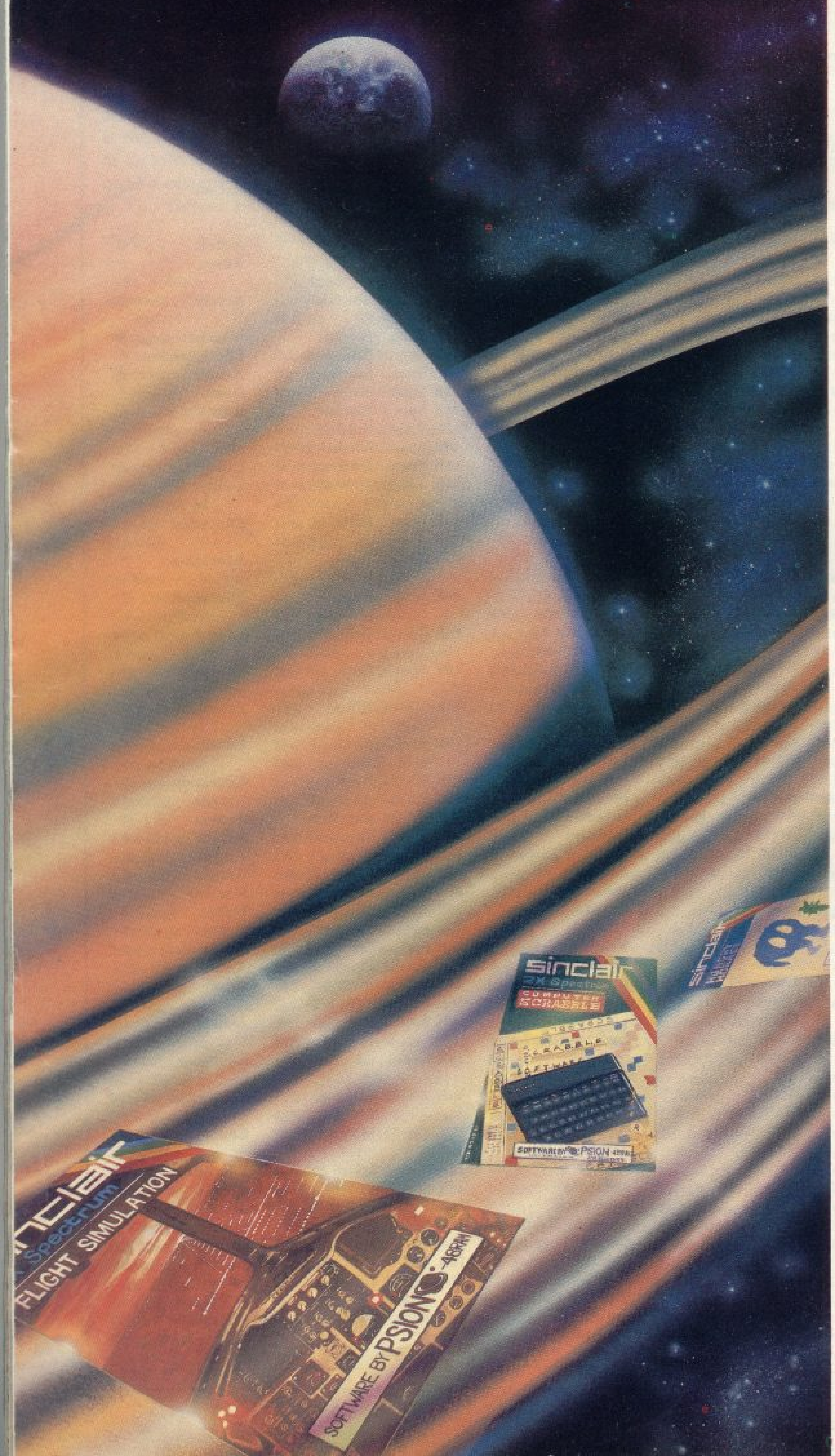
Name	Machine	Company	Type	Gilbert factor
ABC Liftoff	48K Spec.	Longman	Education	*
Accounts (Sole Trader)	48K Spec.	Hestacrest	Business	*
Accounts (Limited Company)	48K Spec.	Hestacrest	Business	*
Accounts (Sole Trader)	16K ZX-81	Hestacrest	Business	*
Accounts (Limited company)	16K ZX-81	Hestacrest	Business	*
Address Manager	48K Spec.	OCP	Business	7
Adventure 1	48K Spec.	Abersoft	Adven.	6
Adventure 1	16K ZX-81	Abersoft	Adven.	6
Adventure Isl.	48K Spec.	Contrast	Adven.	*
Airline	16K ZX-81	CCS	Sim.	*
Airline	48K Spec.	CCS	Sim.	*
Airliner	16K Spec.	Protek	Sim.	*
Air Traffic Controller	16K Spec.	Hewson	Sim.	6
Alien Dropout	16K ZX-81	Silversoft	Arcade	*
Allsort S-1	48K Spec.	A Firminger	Utility	7
Alphabet	16K Spec.	Widget	Education	*
Android One	16K Spec.	Vortex	Adven.	*
Apocalypse	48K Spec.	Red Shift	Mind Game	*
Arcadia	16K Spec.	Imagine	Arcade	5
Arcadian	16K Spec.	J K Greye	Arcade	*
Armageddon	48K Spec.	Silversoft	Arcade	*
Aspect	16K Spec.	Bug Byte	Utility	5
Assassin	16K Spec.	Spectrasoft	Arcade	*
Assembler	48K Spec.	Artic	Utility	6
Asteroids	16K ZX-81	Silversoft	Arcade	*
Asteroids	16K ZX-81	Software Farm	Arcade	6
Astral Convoy	16K ZX-81	Vortex	Arcade	*
Astrology	16K Spec.	Stellar Servs.	Utility	7
Astrology	16K ZX-81	Stellar Servs.	Utility	*
Audio Sonics	16K Spec.	Work Force	Utility	4
Auto Chef	16K Spec.	CCS	Sim.	*
Auto Chef	16K ZX-81	CCS	Sim.	*
Avenger	16K Spec.	Abacus	Arcade	*
Backgammon	48K Spec.	CP	Mind Game	*
Backgammon	16K Spec.	Hewson	Mind Game	*
Bank Account Syst.	48K Spec.	K Gouldstone	Business	8
Bank Raid	16K ZX-81	J M Senior	Game	*
Barrow Quest	16K ZX-81	Sherry	Adven.	*
Base Invaders	48K Spec.	Work Force	Arcade	6
Battle of Britain	48K Spec.	Microgame	Strat.	*
Battleships	16K ZX-81	JRS	Strat.	*
Beamscan	48K Spec.	Hilderbay	Utility	*
Beamscan	16K ZX-81	Hilderbay	Utility	*
Beamscan	48K Spec.	Beamscan	Utility	*
Big Match Soccer	16K Spec.	Winters	Strat.	*
Biorythms/Pyramids of Egypt	16K Spec.	Spectrasoft	Game	*
Black Crystal	48K Spec.	Carnell	Adven.	7
Black Crystal	16K ZX-81	Carnell	Adven.	7
Black Dwarf's Lair	48K Spec.	Newsoft	Adven.	*

Name	Machine	Company	Type	Gilbert factor
Black Hole	16K Spec.	Quest	Arcade	6
Blind Alley	16K Spec.	Sunshine	Arcade	7
Brain Damage	48K Spec.	Silversoft	Arcade	*
Breakaway	16K Spec.	Procom	Arcade	*
Brewery	48K Spec.	P Boulton	Strat.	*
Bridge Master	16K Spec.	Bridgemaster	Education	*
Bridge Master	16K ZX-81	Bridgemaster	Education	*
Bridge Tutor	16K Spec.	CP	Mind Game	*
Business Bank Account	48K Spec.	Transform	Business	*
Business Bank Account	16K ZX-81	Transform	Business	*
Byter	16K ZX-81	Protek	Arcade	*
Calpac 1	16K Spec.	Calpac	Education	*
Calpac 2	16K Spec.	Calpac	Education	*
Calpac 3	16K Spec.	Calpac	Education	*
Calpac 1	16K ZX-81	Calpac	Education	*
Calpac 2	16K ZX-81	Calpac	Education	*
Castle Colditz	48K Spec.	Felix	Adven.	*
Castle Colditz	16K ZX-81	Felix	Adven.	*
Caterpillar	16K Spec.	CDS	Arcade	*
Character Gen	16K Spec.	Spectrasoft	Utility	*
Children's Compendium	16K Spec.	Dymond	Game	*
Collector's Pack	48K Spec.	Sinclair	Business	7
Colossal Caves	48K Spec.	CP	Adven.	*
Compiler	48K Spec.	Softek	Utility	6
Composer	48K Spec.	Contrast	Utility	*
Conflict	48K Spec.	Martech	Strat.	*
Conflict	16K ZX-81	Martech	Strat.	7
Countabout	48K Spec.	Longman	Education	*
Countries of the World	16K Spec.	Hewson	Utility	8
Cosmic Guerilla	16K Spec.	Crystal Comp	Arcade	8
Cosmos	16K Spec.	Abbex	Arcade	7
Copycat	1K ZX-81	Copycat	Utility	*
Counting	16K Spec.	Starter Soft	Education	*
Counting	16K Spec.	Widget	Education	*
Crevasse and Hotfoot	16K Spec.	Microsphere	Games	7
Critical Path Analysis	48K Spec.	Hilderbay	Business	*
Critical Path Analysis	16K ZX-81	Hilderbay	Business	6
Cruising	16K Spec.	Sunshine	Arcade	4
Cyber Rats	16K Spec.	Silversoft	Arcade	7
Cycle Planner	16K Spec.	Medidata	Utility	4
Dallas	16K Spec.	CCS	Sim.	6
Dallas	16K ZX-81	CCS	Sim.	6
Database	48K Spec.	Microl	Business	7
Demolition	16K ZX-81	Comp. Rntls.	Game	*
Derby Day	48K Spec.	Comp. Rntls.	Game	*
Destroyer	16K Spec.	Winters	Game	*
Devils of Deep	48K Spec.	Shephard	Adven.	*
Dictator	16K Spec.	Bug Byte	Strat.	*
Dietron	16K Spec.	Custom	Utility	6
Disassembler	16K Spec.	dK' Tronics	Utility	7
Display	16K Spec.	Work Force	Utility	*

Name	Machine	Company	Type	Gilbert factor
DIY Book-keeping	48K Spec.	RAMTOP	Business	*
DLAN	48K Spec.	Campbell	Utility	*
Do Not Pass Go	48K Spec.	Work Force	Strat.	6
Do Not Pass Go	16K ZX-81	Work Force	Strat.	*
Draft	16K ZX-81	Myrmidon	Business	*
Draughts	48K Spec.	CP	Mind Game	*
Dungeons of Doom	16K ZX-81	Woosoft	Adven.	*
Dungeon Master	48K Spec.	Crystal Comp.	Adven.	8
Dymonoids	16K Spec.	Dymond	Game	*
Editor/Assembler	16K Spec.	Picturesque	Utility	8
Educational	16K Spec.	Startersoft	Education	*
Engine Diagnostic	48K Spec.	Spectrasoft	Utility	*
Escape	16K Spec.	New Generation	Maze	8
Espionage Isl.	48K Spec.	Artic	Adven.	5
Espionage Isl.	16K ZX-81	Artic	Adven.	*
Ext	48K Spec.	Abbex	Arcade	6
Everest Ascent	48K Spec.	Shepard	Adven.	6
Evolution	48K Spec.	Microsphere	Game	*
Family Games Pack	16K Spec.	Hornby	Game	*
Farmer	16K Spec.	CCS	Sim.	*
Farmer	16K ZX-81	CCS	Sim.	*
Faust's Folly	16K Spec.	Abbex	Adven.	6
Fighter Pilot	16K ZX-81	Digital Int.	Sim.	5
Finance Manager	16K Spec.	OCP	Business	9
Firework Music	16K Spec.	Soft Cottage	Education	*
Flight Sim.	48K Spec.	Sinclair	Sim.	6
Flight Sim.	16K ZX-81	Sinclair	Sim.	6
Football	16K Spec.	Winters	Sim.	*
Football Manager	48K Spec.	Addictive Gms.	Sim.	7
Football Manager	16K ZX-81	Addictive Gms.	Sim.	*
Forth	48K Spec.	Abersoft	Language	9
Forth	48K Spec.	Sinclair	Language	7
Forth	16K ZX-81	Sinclair	Language	7
Four Rules of Number	16K Spec.	Micro Master	Education	*
Four Rules of Number	16K ZX-81	Micro Master	Education	*
French Voc Test	16K Spec.	Tutorial	Education	*
French Voc Test	48K Spec.	Tutorial	Education	*
Froggy	16K ZX-81	DJL	Arcade	7
Froggy	16K Spec.	DJL	Arcade	7
Fruit Line	16K Spec.	P A Hanson	Game	*
Fruit Machine	16K Spec.	dK' Tronics	Game	6
Full-screen Breakout	1K ZX-81	New Generation	Arcade	*
Galaxians	16K Spec.	Artic	Arcade	6
Galaxian 5	16K Spec.	Abbex	Arcade	*
Galaxy Conflict	48K Spec.	Martech	Strat.	*
Galaxy Conflict	16K Zx-81	Martech	Strat.	8
Gangsters	48K Spec.	P Boulton	Strat.	*
Gambling Tape	16K Spec.	Dymond	Game	*
Games	16K ZX-81	P Teakle	Game	*
Games 2	16K ZX-81	JRS	Game	*
Games Tape 1	1K ZX-81	J K Greye	Game	*
Games Tape 2	16K ZX-81	J K Greye	Game	*
Games Tape 3	16K ZX-81	J K Greye	Game	*
Games Pack 1	16K Spec.	A Burnham	Game	*
Games Tape 1	16K Spec.	Sospan	Game	*
Games Tape 2	16K Spec.	Sospan	Game	*
Ghost Hunt	16K Spec.	PSS	Arcade	*
Gnasher	16K Spec.	R & R	Maze	8
Gobble-a-Ghost	16K Spec.	CDS	Arcade	*
Gobbleman	16K Spec.	Artic	Arcade	*
Gobbleman	16K Zx-81	Artic	Arcade	*
Gobbler	16K ZX-81	Software Farm	Arcade	*
Golden Apple	48K Spec.	Artic	Adven.	*
Golf	16K Spec.	R & R	Sim.	7
Golf	16K Spec.	Virgin	Sim.	8
Gorilla	16K Spec.	D Hornsby	Game	*
Grand Prix	16K ZX-81	dK' Tronics	Arcade	*
Graphics	16K ZX-81	IPA	Utility	*
Graphics Toolkit	16K ZX-81	JRS	Utility	9

Name	Machine	Company	Type	Gilbert factor
Great Britain Ltd	48K Spec.	Hessel	Strat.	7
Great Britain Ltd	16K ZX-81	Hessel	Strat.	*
Greedy Gulch	16K ZX-81	Phipps	Adven.	7
Ground Attack	16K Spec.	Silversoft	Arcade	6
Ground Force Zero	16K Spec.	Titan	Arcade	*
Gulp 2	16K ZX-81	Campbell	Arcade	*
Gulpman	16K Spec.	Campbell	Arcade	*
Halls of Things	48K Spec.	Crystal Comp.	Adven.	9
Hanoi King	48K Spec.	Contrast	Mind Game	*
Heathrow	16K Spec.	Hewson	Sim.	8
Hidden Letters	16K Spec.	Poppy	Education	*
High Noon	48K Spec.	Work Force	Arcade	9
High-resolution Graphics	1K ZX-81	P Moody	Utility	*
High-resolution Invaders	16K ZX-81	Odyssey	Arcade	*
Hitch Hikers' Guide to the Galaxy	48K Spec.	ESP	Adven.	6
Hobbit	48K Spec.	Sin/M.Hse.	Adven.	9
Horace and the Spiders	16K Spec.	Sinclair	Arcade	8
Horace Goes Skiing	16K Spec.	Sinclair	Arcade	8
Hot Dot Spotter	16K Spec.	Longman	Education	*
Hungry Horace	16K Spec.	Sinclair	Arcade	8
I Ching	48K Spec.	Sirius	Game	*
Inca Curse	48K Spec.	Sinclair	Adven.	6
Inca Curse	16K ZX-81	Sinclair	Adven.	*
Inkos	48K Spec.	Chalksoft	Sim.	*
Integration	16K Spec.	University	Utility	8
Integration	16K ZX-81	University	Utility	8
Intermediate English 1	16K Spec.	Rose	Education	*
Intermediate English 1	16K ZX-81	Rose	Education	*
Intermediate English 2	16K Spec.	Rose	Education	*
Intermediate English 2	16K ZX-81	Rose	Education	*
Intermediate Maths 1	16K Spec.	Rose	Education	*
Intermediate Maths 1	16K ZX-81	Rose	Education	*
Intermediate Maths 2	16K Spec.	Rose	Education	*
Intermediate Maths 2	16K ZX-81	Rose	Education	*
Invaders	16K ZX-81	Abersoft	Arcade	*
Invaders	16K ZX-81	Bug Byte	Arcade	*
Invaders	16K ZX-81	Silversoft	Arcade	*
Invasion Force	16K Spec.	Artic	Arcade	8
Jackpot	48K Spec.	Comp. Rntls.	Arcade	*
Johnny Reb	48K Spec.	Lothlorian	Sim.	*
Keysounder	16K Spec.	S and G	Utility	*
The Key	16K Spec.	Keysoft	Utility	*
Knight's Quest	48K Spec.	Phipps	Adven.	6
Knight's Quest	16K ZX-81	Phipps	Adven.	*
Krackit	16K Spec.	Artic	Adven.	4
Krackit	16K ZX-81	Artic	Adven.	4
Labyrinth	16K Spec.	Axis	Arcade	4
Language Devel. Series	16K Spec.	Glasson	Education	*
Language Devel. Series	16K ZX-81	Glasson	Education	*
Language Devel. Series	16K ZX-81	Micro Master	Education	*
Language Devel. Series	16K Spec.	Micro Master	Education	*
Lazatron	48K Spec.	Contrast	Arcade	*
Leap Frog	16K Spec.	CDS	Arcade	*
Learning Read 1	16K Spec.	Poppy	Education	*
Linear Progging	16K Spec.	University	Utility	*
Linear Progging	16K ZX-81	University	Utility	*
Lost Island	16K ZX-81	JRS	Adven.	*
Machine Code Test Tool	16K Spec.	OCP	Utility	7
Machine Code				

THE BEST SOFTWARE ON EARTH COMES FROM PSION.



Psion is the source for the best software programs you'll ever see on a Sinclair Spectrum.

Our range runs rings round other software. In short, it's faster, livelier and more colourful.

Why?

Ideas. At Psion, they're bigger and more ambitious.

We combined a 12,000-word dictionary with complex logic – and the result is spectacular: our Computer SCRABBLE® program. Then there's the 'Horace' series…

It's all down to programming skill. Flight Simulation – a 'real-time' program – is a special breakthrough in this field. Few other programs make such full use of your Spectrum's capabilities.

In all, there are 12 challenging titles, published exclusively under the Sinclair label. (Not counting the free 'Horizons' cassette that introduced you to your computer.)

Psion programs for the Spectrum:

- Flight Simulation (48K)
- Chess (48K)
- Space Raiders
- Planetoids
- VU-CALC
- VU-FILE
- VU-3D (48K)
- Hungry Horace
- Horace and The Spiders
- Horace goes Skiing
- Backgammon
- Computer SCRABBLE® (48K)

'Horace' series produced in conjunction with Melbourne House. SCRABBLE® trademark and copyright licenced by Scrabble Schutzrechte und Handels GmbH – a J. W. Spear and Sons PLC subsidiary.

Unbelievable? A recent W H Smith chart of best-selling Spectrum programs speaks for itself. No less than 7 of the top 12 cassettes are by Psion. And there's more to come. Watch out for our very latest program, 'Chequered Flag.'

In fact, if you're choosing software for your Spectrum, there's just one way to find the best…

Look for the Psion symbol on the cover of the cassettes.

PSION

Cassette Round-up

Name	Machine	Company	Type	Gilbert factor
Test Tool	16K ZX-81	OCP	Utility	*
Mad Martha	48K Spec.	Miko-Gen	Adven.	7
Magic Mountain	16K ZX-81	Phipps	Adven.	*
Mailing List	16K ZX-81	Hestacrest	Business	*
Masterfile	48K Spec.	Campbell	Business	8
Masterfile 16	16K Spec.	Campbell	Business	*
Matcalc	16K Spec.	Work Force	Utility	*
Maths Tutor	16K Spec.	AD Software	Education	*
Matrix Operations	16K ZX-81	University	Utility	7
Matrix Operations	16K Spec.	University	Utility	7
Maze Chase	16K Spec.	Hewson	Arcade	8
Maze Death Race	48K Spec.	PSS	Arcade	*
Maze Death Race	16K ZX-81	PSS	Arcade	*
Maze Man	16K ZX-81	Abersoft	Arcade	*
Maziacs	48K Spec.	dK' Tronics	Arcade	8
Mazogs	16K ZX-81	Bug Byte	Arcade	*
MCoder	16K Spec.	PSS	Utility	*
MCoder	16K ZX-81	PSS	Utility	*
Merchant of Venus	16K ZX-81	Crystal	Adven.	7
Meteoroids	16K Spec.	dK' Tronics	Arcade	*
Meteoroids	16K Spec.	Softek	Arcade	6
Meteor Storm	16K Spec.	Quicksilva	Arcade	7
Micropen	16K Spec.	Contrast	Utility	*
Mined Out	16K Spec.	Quicksilva	Arcade	7
Mines of Saturn/ Return to Earth	16K Spec.	Mikro-Gen	Adven.	*
Money	16K Spec.	Poppy	Education	*
Muncher	16K Spec.	Silversoft	Arcade	*
Muncher	16K ZX-81	Silversoft	Arcade	*
Namtir Raiders	16K ZX-81	Artic	Arcade	8
Night Gunner	16K ZX-81	Digital	Sim.	5
NightFlite	16K Spec.	Hewson	Sim.	5
Nowotnik Puzzle	16K Spec.	Phipps	Game	7
Nowotnik Puzzle	16K ZX-81	Phipps	Game	*
Odds-on	16K Spec.	RSD	Game	*
O Level Chemistry	48K Spec.	Calpac	Education	*
O Level Chemistry	16K ZX-81	Calpac	Education	*
O Level Fench Revision	16K ZX-81	Rose	Education	*
O Level Maths Revision	16K ZX-81	Rose	Education	*
O Level Physics	16K Spec.	Homestudy	Education	*
O Level Physics	48K Spec.	Think Tank	Education	*
Omnicalc	48K Spec.	Microsphpere	Business	9
Orbiter	16K Spec.	Silversoft	Arcade	7
Original Superchess	48K Spec.	CP Software	Tradtitional	*
Original Superchess	16K ZX-81	CP Software	Traditional	*
Ostron	16K Spec.	Softek	Arcade	*
Othello	16K Spec.	CP Software	Traditional	*
Othello	16K Spec.	M.O.I.	Traditional	*
Othello	16K ZX-81	M.O.I.	Traditional	*
Pathfinder	16K Spec.	Widget	Education	*
Payroll	48K Spec.	Hilderbay	Business	9
Payroll	16K ZX-81	Hilderbay	Business	*
Payroll	32K ZX-81	Soft Tech	Business	*
Payroll	48K ZX-81	Soft Tech	Business	*
Peek	16K Spec.	Zen	Utility	*
Penetrator	48K Spec.	Mel. Hse.	Arcade	7
Personal Banking System	48K Spec.	Hilton	Business	*
Personal Banking System	16K ZX-81	Hilton	Business	*
Pharoah's Tomb	16K ZX-81	Phipps	Adven.	*
Pilot	16K ZX-81	Hewson	Simulation	7
Pimania	16K ZX-81	Automata	Simulation	*
Pimania	48K Spec.	Automata	Simulation	7
Pinball	16K Spec.	Winters	Game	*
Planet of Death	16K Spec.	Artic	Adven.	6
Planetoids	16K Spec.	Sinclair	Arcade	8
Polynomials	16K Spec.	University	Utility	8
Polynomials	16K ZX-81	University	Utility	
Pool	16K Spec.	Bug Byte	Game	7
Pre/early school cassettes	16K Spec.	Essex	Education	*
Primary Arithmetic	16K Spec.	Rose	Education	*
Primary Arithmetic	16K ZX-81	Rose	Education	*

Name	Machine	Company	Type	Gilbert factor
Print Shop	16K Spec.	CCS	Simulation	8
Print Shop	16K ZX-81	CCS	Simulation	*
Pro-Golf	16K Spec.	Hornby	Game	7
Programmer's Dream	16K Spec.	Work Force	Utility	8
Programme Enhancement Package	16K ZX-81	R and R	Utility	*
Puckman	16K ZX-81	Hewson	Arcade	*
Purchase Ledger	16K ZX-81	Hestacrest	Business	*
Quest	48K Spec.	Hewson	Adven.	6
Ramopoly	48K Spec.	J Fletcher	Game	*
Red Weed	48K Spec.	Lothlorian	Simulation	*
Regression	16K Spec.	University	Utility	8
Regression	16K ZX-81	University	Utility	*
Renumber Delete	16K Spec.	Work Force	Utility	*
Renumber Delete	16K ZX-81	Work Force	Utility	*
Rescue	48K Spec.	Computer Rent	Arcade	*
Reversi	16K Spec.	Sinclair	Traditional	8
Roulette	16K Spec.	Newsoft	Traditional	*
Roulette	48K Spec.	Dymond	Traditional	*
Sales Day Book	48K Spec.	Transform	Business	*
Sales Day Book	16K ZX-81	Transform	Business	*
Sales Ledger	16K ZX-81	Hestacrest	Business	*
Secret Valley	16K Spec.	Newsoft	Adven.	*
Secret Valley	16K ZX-81	Newsoft	Adven.	*
Self-teach Program	16K Spec.	Anvil	Education	*
Self-teach Program	16K ZX-81	Anvil	Education	*
Sentinel	16K Spec.	Abacus	Arcade	*
Serpents Tomb	16K ZX-81	Vortex	Adven.	*
The Settler	16K Spec.	BSS	Utility	*
The Settler	16K ZX-81	BSS	Utility	*
Shape Sorter	16K Spec.	Widget	Education	*
Sideways Copy	16K ZX-81	D King	Utility	*
Sheepwalk	48K Spec.	Virgin	Game	7
Ship of Doom	48K Spec.	Artic	Adven.	7
Shiva Special 1	16K Spec.	Shiva	Games	*
Shopping List	16K Spec.	SD	Utility	*
Sky Raider	16K Spec.	C M Smith	Arcade	*
Slippery Sid	16K Spec.	Silversoft	Arcade	8
Slow Loader	16K Spec.	ELR	Utility	9
Snail Logo	48K Spec.	CP	Language	*
Softalk 1	48K Spec.	CP	Utility	*
Softalk 2	48K Spec.	CP	Utility	*
Solaris	48K Spec.	Sotel	Arcade	*
Solo Whist	16K Spec.	Video Soft.	Traditional	*
Sound FX	16K Spec.	dK' Tronics	Utility	6
Space Fighter	16K Spec.	Winters	Arcade	*
Space Intruders	16K Spec.	QS	Arcade	7
Space Raiders	16K Spec.	Sinclair	Arcade	6
Space Raiders	16K ZX-81	Sinclair	Arcade	*
Space Trek	16K ZX-81	JRS	Arcade	*
Space Zombies	16K Spec.	Mikro-Gen	Arcade	*
Spanish Gold	48K Spec.	Chalksoft	Education	*
Speak and Spell	48K Spec.	S and G	Education	*
Spec. Assembler	48K Spec.	Artic	Utility	*
Spec. Bug	16K Spec.	Artic	Utility	*
Spec. Tape Copier	16K Spec.	S Giza	Utility	*
Spectadraw 2	48K Spec.	McAlley	Utility	*
Spectipede	16K Spec.	R and R	Arcade	8
Spectral Panic	16K Spec.	Hewson	Arcade	5
Spec. Compiler	48k Spec.	Softek	Utility	7
Spec. Editor/ Assembler	16K Spec.	Picturesque	Utility	8
Spec. Forth	48K Spec.	Abersoft	Language	9
Spec. Forth	48K Spec.	CP	Utililty	*
Spec. Frogs/ Showdown	16K Spec.	Artic	Arcade	*
Spec. Gobbleman	16K Spec.		Arcade	*
Spec. Invaders	16K Spec.	Artic	Arcade	*
Spec. Invasion Force	16K Spec.	Artic	Arcade	*
Spec. Microchess	16K Spec.	Artic	Traditional	*
Spec. Monitor	16K Spec.	Picturesque	Utility	8
Spec. Scramble	16K Spec.	Work Force	Arcade	7
Spec. Sound	16K Spec.	M Afzal	Utility	*

Cassette Round-up

Name	Machine	Company	Type	Gilbert factor
Spellbin	16K Spec.	Startersoft	Education	*
Spookyman	16K Spec.	Abbex	Arcade	7
Spreadsheet	48K Spec.	MICROL	Business	7
Superchess II	48K Spec.	CP	Traditional	8
Super Play I	16K Spec.	Video	Games	*
Superspy	48K Spec.	Shepherd	Adven.	5
Tai	16K ZX-81	PSS	Game	*
Tank Battle	16K Spec.	dK' Tronics	Game	8
Tape Breaker	16K Spec.	Spectrasoft	Utility	*
Tasword	48K Spec.	Tasman	Business	8
Tasworld II	48K Spec.	Tasman	Business	9
Teacheraid	16K Spec.	B Farris	Education	*
Teach Data	48K Spec.	B Farris	Education	*
Teacher Data	48K Spec.	Farris	Utility	7
Tennis	16K Spec.	Winters	Game	*
Tenpin	16K ZX-81	Phipps	Game	*
Test Match	48K Spec.	Computer Ren.	Game	*
The Orb	48K Spec.	Computer Ren.	Adven.	*
The Great Western	16K Spec.	New Soft	Game	*
The Great Western	16K ZX-81	New Soft	Game	*
Time Bandits	16K Spec.	New Soft	Adven.	*
Time Bandits	16K ZX-81	New Soft	Adven.	*
Time Gate	48K Spec.	QS	Arcade	8
Tomb of Dracula	48K Spec.	Felix	Adven.	*
Tomb of Dracula	16K ZX-81	Felix	Adven.	*
Trace	16K Spec.	Zen	Utility	*
Trace	16K Spec.	Texgate	Utility	8
Train Game	48K Spec.	Microsphere	Game	9
Transylvanian Tower	48K Spec.	Shepherd	Adven.	*
Troon	48K Spec.	Hornby	Game	8
Tube Train Terror	48K Spec.	JRS	Game	*
3D Tunnel	48K Spec.	New Gen.	Arcade	9
The Turk	48K Spec.	OCP	Traditional	8
Use and Learn	16K Spec.	MiCROL	Utility	8
Velnor's Lair	48K Spec.	QS	Adven.	8
Voice Chess	48K Spec.	Artic	Traditional	9
Volcanic Dungeon	16K ZX-81	Carnell	Adven.	*
Volcanic Dungeon	48K Spec.	Carnell	Adven.	6
Vu-Calc	16K Spec.	Sinclair	Business	7
Vu-File	16K Spec.	Sinclair	Business	8
Vu3D	48K Spec.	Sinclair	Utility	8
Warlord	48K Spec.	Lothlorian	Simulation	*
Wizard's Warriors	16K Spec.	Abersoft	Arcade	*
Word Fit	16K ZX-81	Ram Writer	Game	6
Word Processor	48K Spec.	MiCROL	Business	*
World Info	48K Spec.	Wimsoft	Utility	*
X Ray	16K Spec.	Zen	Utility	*
Yahtzi	48K Spec.	Work Force	Traditional	*
Yomp	16K Spec.	Virgin	Arcade	7
Zodiac I	16K ZX-81	Stellar	Utility	*
Zodiac II	16K ZX-81	Stellar	Utility	*
Zodiac F	48K Spec.	Stellar	Utility	7
ZXAS	16K ZX-81	Bug Byte	Utility	*
ZX-Bug	16K ZX-81	Artic	Utility	*
ZX-Chess I	16K ZX-81	Artic	Traditional	*
ZX-Chess II	48K Spec.	Artic	Traditional	*
ZX 1K Chess	1K ZX-81	Artic	Traditional	*
ZX Compiler	16K ZX-81	Silversoft	Utility	*
ZXDB	16K ZX-81	Bug Byte	Utility	*
ZX Draughts	48K Spec.	CP	Traditional	*
ZXED	16K Spec.	dK' Tronics	Utility	*
ZX Forth	16K ZX-81	Artic	Language	8
ZX Forth	48K Spec.	Artic	Language	8
ZX-81 1K Games Pack	1K ZXZ-81	Crystal	Games	9
ZX Invasion Force	16K ZX-81	Artic	Arcade	*
ZX-81 Pocket Book	16K ZX-81	Phipps	Games	*
ZX-81 Remload	16K-64K ZX-81	Picturesque	Utility	*
ZX Screenkit	4K-64K ZX-81	Picturesque	Utility	*
ZX-sideprint	16K ZX-81	Microsphere	Utility	*
Zuckman	16K ZX-81	DJL	Arcade	8

Advertisement Index

sinclair supermart

GUITAR TUTOR 1
48K SPECTRUM £4.95
Learn to play the easy way. See and hear whether you've got it right. Takes the guess-work out of learning to play and makes it fun! Designed for beginners!

GUITAR TUTOR 2
48K SPECTRUM £4.95
A natural progression from Tutor 1. All you need to become a more polished musician.

CHORD DICTIONARY
48K SPECTRUM £4.95
See and hear all the chords you're likely to need in every key.
Also 100's of games 16 & 48K Spectrum. Send sae for details.
Cheques/P.O.'s to:

HARLEQUIN SOFTWARE
43 OSPREY PARK, THORNBURY, BRISTOL BS12 1LY.

NEW SOFTWARE

'BEAT THE GAMES' PLAY WITH EDUCATION

New programs written by university academics for

SINCLAIR SPECTRUM 48K

Secondary level learning and revision programs in:

British History
European History
English Literature

Programs on disk for other microcomputers also available.

Write/'phone for catalogue *(no stamp required)*

Sussex Software, FREEPOST, Devizes, Wilts. SN10 1BR.
Tel: Seend (038 082) 337

Bowies
The Computer People

Bowies are leading specialist suppliers of the Sinclair ZX Spectrum Personal Computers. We consider our service to those who own, or who are interested in any products in our range cannot be matched by any other supplier. Just look at what we have to offer.

- ★ Shop Demonstration Facilities
- ★ Helpful Advice
- ★ Huge Range (Software, Hardware, Peripherals, Books etc)
- ★ Educational Specialists
- ★ Try Before you Buy
- ★ Service/Repairs – (Cheaper than Sinclair!)
- ★ Breakdown Insurance
- ★ Competative Prices
- ★ Mail Order – (24 hour service)
- ★ Easy Payment – (Visa, Access, etc)
- ★ Opening hours: (Sat 8.30–5.30, Tues – Fri 10.30–5.30)

Want to know more about the ZX Spectrum and the great Products and Services available at Bowies? Then write or call for our free catalogue.

56 Bradford Street, Walsall, West Midlands WS1 3SU
Why not phone your order? Tel: (0543) 371090

SPECTRUM
16K or 48K

NUMBER 6

Is your child aged 6, 7 or 8 and need a little extra tuition at Maths? The NUMBER 6 program was written by teachers initially for school use, but now it is available to all Spectrum owners.

Prime Software
23 Beaconfield Road, Plymouth PL2 3LD

THIS'LL TEACH YOU A LESSON!!

(...or two)

GCE O LEVEL/CSE Cassettes for the **48K SPECTRUM** with COLOUR and MOVING GRAPHICS

PHYSICS 6 Programs for £6·50
- ✱ Solids, Liquids and Gases
- ✱ Vectors and Scalars
- ✱ Acceleration
- ✱ Graphs of Motion
- ✱ Gravity, Weight and Friction
- ✱ Newton's Laws

CHEMISTRY 6 Programs for £6·50
- ✱ Chemical Change
- ✱ Types of Reaction
- ✱ Rate of Reaction
- ✱ Chemical Combination and the Mole
- ✱ Chemical Equilibrium
- ✱ Energy Changes

OR BOTH for £12

Cheque/PO (payable THINK TANK) to:

think tank Educational Software

Dept SUIN), 35 Wellington Road, Wimbledon Park, London SW19 8EQ

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

Tune your TV for optimum performance by using "TV COLOUR TUNE"—an educational and instructive program for the 48K Spectrum giving CROSS HATCH and COLOUR-BAR SIGNALS with relevant back-up of the physics of colour TV transmission

£3.75 each, or get one

FREE

with every 3 titles ordered

CHESS	48K ARTIC	£9.45
CHESS PLAYER	48K QS	£6.95
TIMEGATE	48K QS	£6.95
MINED OUT	48K QS	£4.95
STAR TREK	48K R+R	£4.95
MICRO CHESS	16K ARTIC	£6.95
GOBBLEMAN	16K ARTIC	£4.95
GOLF	16K R+R	£3.75
SPACE INTRUDER	16K QS	£4.95
METEOR STORM	16K QS	£4.95

We are now a major source of EDUCATIONAL programs ranging from INFANT to CSE/GCE. Top rate service and comprehensive supply only from:

LOCATOR, 12 Fernhall Drive, Redbridge, Essex 1G4 5BN. Tel: 01-550 5575

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

ZX SPECTRUM SOFTWARE

25 Super programmes—machine code arcade games, adventures, dungeons & dragons, puzzles and ball games. Including Breakout (taking you through 9 skill levels), Star Wars, Amazing 3D Mazes, 3D Noughts & Crosses, Corridors of Doom, Trap It, Housebreak and Yahtzee. All 25 on one cassette for only £9.95.
48K ARCADE ACTION PACK – Three super fast action arcade games direct from Israel. Mission Omega, Close In and Smiley . . . All three on one cassette for only £6.95.
Both packs as above only £15.95.

SPARTAN SOFTWARE (DEPT SU)
9 Cotswold Terrace,
Chipping Norton, Oxon.

CUT YOUR HEATING BILLS

A powerful new program for the 48K Spectrum. Find out what insulation could do for your house.

- *Predicts annual savings from: double glazing — insulation of solid/cavity walls, floors or roofs — change of fuel/heater/thermostat setting.
- *Easy to use — mostly Y/N or mult. choice questions.
- *Saves house data on cassette.
- *Detailed instruction — fully error trapped.
- *Written by Cambridge Engineering Graduate.

Only £7.95 inc p&p. Brane Software, Myrtle Grove, Brane, Sancreed, Penzance TR20 8RE. 073 672 462

COMPUTERISED JOGGERS DIARY

At last an automated diary for all Joggers and Athletes with access to 48K SPECTRUM computers.

Comprehensive facilities include:

- — Up to 20 Routes or Events and 1,000 individual performance entries on one data tape.
- — Weekly mileage analysis.
- — Times, time per mile and pulse rate analysed by Route between specified dates.
- — Excellent graphical output.
- — Comprehensive hard copy facilities.
- — Menu driven, very friendly and much more.

Send cheque/P.O. for £6.95 to
L. Chantler, 34 Green End Street,
Aston Clinton, Bucks. HP22 5JE.

HOME STUDY LTD.

PROGRAMS AND DETAILS FROM:
TRELEIGH WOODS FARM
REDRUTH CORNWALL

48K SPECTRUM
PHYSICS 'O' LEVEL A.E.B. Syllabus 052 1983/4

8	TEACHING PROGRAMS (including games) C30 (EXCELLENT FOR ALL SYLLABUSES)		£8.40
8	PAPER 1 (multiple choice) PROGRAMS 400 questions	(C30)	£5.15
13	PAPER 2 (practical) PROGRAMS 39 questions	(C30)	£5.15
8	PAPER 3 (theory) PROGRAMS 128 questions	(C30)	£5.15

All programs feature instant answers, instant explanations, probable grade estimate.

WHEN YOU BUY THE COMPLETE SET (2 × C60) £22.00

WE GUARANTEE YOUR EXAMINATION SUCCESS

OR WE WILL REFUND THE FULL PURCHASE PRICE

EAST MIDLAND SOFTWARE

CARIBBEAN TRADER 48K SPECTRUM £4.95

The trading game for the cunning business-like mind.

BALTIC PATROL (16/48K SPECTRUM specify type) £4.95. Arcade style game: progressive levels of difficulty. Subs: helicopters, torpedoes, mines, bombs, missiles. Amazing graphics. A game of skill and co-ordination.

KING ARTHUR 48K SPECTRUM £4.95

Witty union simulation, various levels of industrial action.

WHO DARES WINS 48K SPECTRUM £4.95

An exciting SAS chase adventure, set in the Argentine.

All games supplied on quality cassettes.

Send Cheques and PO's to:
East Midland Software, Sales Dept,
54 Ryecroft Street, Stapleford, Notts N69 8AX.

POOLS PREDICTION
"POOLSWINNER"

The most sophisticated Pools Prediction Aid available. Gives probabilities of score draws, draws, homes or aways, based on two databases holding over 20,000 matches (included).

The databases are automatically updated as results are entered.

Can be used in simple mode, or with parameter adjustments to develop your own unique forecast method.

Fully documented, available now for Apple, Spectrum (48K), Dragon, ZX-81 (16K) (others—please enquire)

£15.00 (discs/tapes)

"POOLSDATA"

Complete record of all English Football League matches 1978–83. Teams, scores and dates of 10,000 matches held in simple format, ready for your analysis. Starter analysis programs and full documentation included. Available for Apple Spectrum, ZX-81, BBC, Dragon, Commodores series

Discs (5 year) £15.00
Tapes (5 year) £12.50
Tapes (2 year) £7.70
all prices (p&p included)

SELEC SOFTWARE (SU)
37 Councillor Lane,
Cheadle, Cheshire
061–428 7424

SELEC SOFTWARE
ZX-81 MACHINE CODE SPECIALISTS

1K ZX-81 GAMES
THE BEST AVAILABLE

TICK

- MAZE GUZZLER/SUPERBREAKOUT ☐
  Superb Full Feature maze-chaser game, plus big-screen Breakout. £4.50
- THE INVADERS/TIMEBOMB ☐
  Original space invaders, plus a new spine-chilling game. £4.50
- ZX-PANIC/ZX-SQUASH ☐
  Two new big screen all action games. £4.50
- FREE CATALOGUE ☐

Please send the items ticked to:

Name ....
Address ....
....
....

I enclose cheque/PO for £.......................

SELEC SOFTWARE

37 Councillor Lane,
Cheadle, Cheshire
061-428 7425

ANVIL COMPUTING

SUPERB NEW SELF TEACH PROGRAM

For ZX-81 (16K), Spectrum. TRS80. Video Genie.

★ Now you can learn basic fast and efficiently ★

★ Forget your past programming problems. This program will make it all clear ★

★ ★ ★ ★ ★ ★ ★

Cover Arrays, Sorting, Searching, Counting, Decision making tests, Error Trapping, Menu driving etc. You start with short simple programs and build up to full working programs with everything explained in full, precise detail.

★ ★ ★ ★ ★ ★ ★

★ This is *NOT* a program you simply copy and run ★
★ ★ *YOU HAVE GOT TO WORK!!* ★ ★
But it is written in such a way that you can not get stuck.

★ ★ ★ ★ ★ ★ ★

This program has been fully tested over the past six months by 50 domestic and small business users and we have not received any adverse reports.

★ ★ ★ ★ ★ ★ ★

This program is our own product and is not available from any other source. Full money back guarantee. **£4.75** incl. Postage & Packing (state which computer).

51 Whitcliffe Lane, Ripon, Yorks HG4 2LB.

IMPORTANT NOTICE

Unfortunately an error was published in Softek's August Advertising. Softek does not guarantee a full refund should a program fail to load, however, it does guarantee a replacement cassette.

Dr T. Langdell
SOFTEK
INTERNATIONAL LTD

The rate for classified advertising in the

sinclair supermart

is only £9.00 per single column centimetre.

PROGRAMMERS

We urgently require good quality software for the ZX Spectrum. For the right kind of material we offer — Expert presentation — Improved market penetration — World-wide distribution — Total distribution in the UK and a high 25% Royalty.

SPARTAN SOFTWARE
9 Cotswold Terrace,
Chipping Norton, Oxon.

PERSONAL FINANCIAL MANAGEMENT SYSTEM

A serious financial application for 48K Spectrum

- *5 accounts and 26 expenditure categories each with balance enquiry, detailed statements for variable periods, full update facility.
- *Sophisticated standing orders, featuring: variable payment intervals; transfer between accounts; any number of payments; fully updateable.
- *Fully menu drive + user friendly.
- *Data stored on external tape file.

£7.95 incl p&p

- *Cheques to FULWOOD SOFTWARE (Dept S), 20 Templestowe Hill, Whitkirk, LEEDS LS15 7EJ

ZX81 SPECTRUM, DRAGON, BBC AND VIC SOFTWARE LENDING LIBRARY

We have for hire from 50p (inc. post) programs for your computer.

£5 life membership (less than the cost of a single game) brings you the SOFTWARE LENDING LIBRARY membership kit, catalogue and news letter.

Send cheque or PO for £5 to:
SOFTWARE LENDING LIBRARY
PO Box 3, Castleford, West Yorks
Stating name, address and computer type.

All tapes used with manufacturers' permission

To advertise in the **Sinclair Supermart**, call Annette on (01) 359 3525 **NOW!**

SWAG + VOYAGER for 16K ZX81

2 Top Games on 1 Tape—Only £2.95

SWAG — Dodge the cops and rob the bank in this exciting COPS 'N' ROBBERS game.

VOYAGER — Twist through every obstacle thrown at you then destroy the Empire.

HOWARD SOFTWARE
20 Pantycelyn, Fishguard,
Dyfed SA65 9EL

SPECTRUM TOOLKIT

Written in machine-code for 48K model. Includes fast and full renumber, find and change strings, block move, copy and delete, variable name lister. £5.95 including P&P.

J. A. WHITING
Claremont, 46 Hillside Grove,
Chelmsford CM2 9DA.
Tel: Chelmsford (0245) 354942.

BANK ACCOUNT

48K SPECTRUM
AS REVIEWED IN SINCLAIR USER 18
PLUS ANALYSIS OF PAYMENTS

Auto Standing Order, Full Screen Online Update, Screen Enquiry, Statement Print with easy to use Online Manual.

£4.00 K. J. Gouldstone
45 Burleigh Avenue
Wallington, Surrey SM6 7JG

DISCOUNT SOFTWARE

Spectrum ZX81. Discounts up to 25%!

		RSP	Our Price
The Hobbit	Melbourne	14.95	11.99
Zzoom	Imagine	5.50	4.25
3D Tanx	DK'Tronics	4.95	3.70
Kong	Ocean	5.90	4.60

55p p&p 1 Tape,
2 or more Cassettes Post Free.

SAE for Full Discount Lists:
Discount Software,
45 Brunswick, Bracknell, Berks.

SPECTRUM OWNERS (16K/48K) with children, a simple yet effective program that makes tables fun to learn. Suitable, infants or juniors £3.50 inc, P&P. P. J. Hubbard, 109 Waltham Avenue, Hayes, Middx UB3 1TD.

MONEY OFFERED for your unwanted Spectrum games tapes (not copies). Wanted ZX81 — must be cheap. Please apply with sae to J. Bowley s.u. c/o 136 Lancaster Drive, Hornchurch, Essex RM12 5SL.

SPECTRUM STOP. Amazing cassette lets you stop and look at machine code programs. Order as Study 1, £3.95. ZX-Guaranteed (Office S1), 29 Chadderton Drive, Unsworth, Bury, Lancs.

48K SPECTRUM LISTFILE. Holds up to 600 names/addresses, etc. Machine code search finds any in one second. £5.00. ZX-Guaranteed (Office S1), 29 Chadderton Drive, Unsworth, Bury, Lancs.

'BUDGET' ACCOUNTING on 48K Spectrum. User-friendly. Interesting features. Many applications in home or office. £8.95. Demonstration tape for £1 (refundable). **Womack Computer Systems**, 50 Beech Close, Clayton-le-Dale, Blackburn, Lancs.

TEST MATCH. Captain England against World XI. Select strokes, bowlers, field-placings, etc. Run-rate, bad weather. 40 overs innings both sides. Realistic. ZX-81—16K. £3.95. Bosoft, Lynbrook, Borth, Dyfed.

ZX-81 PLUS RAM Pack and printer £65. Also 48K Spectrum. £85. Tel: 021-358 5539 (evenings).

SPECTRUM SOFTWARE for sale. Spectres, Inca Curse, Timegate, £3.50 each. Planetoids, Leapfrog, Hungry Horace, Space Raiders, £2.50 each. Games 1 (ICL), Golf (R&R). £1.50 each. Tel: Cardiff (0222) 41993.

HI-RES PACK, Memoteny, original packing, £20 ono. Write to Steven Mai, 102 Sutton Court Road, Chiswick, London W4 3EQ or telephone (mornings only), 01-747 3058.

16K ZX-81 plus green screen and over £25 of software including Football Manager and Sorcerer's Island, in all, worth over £90. Bargain at £45. Tel: Crieff (0726) 3615.

ZX-81 16K RAM 4K graphics ROM, DK'Tronics. Keyboards all leads, manaual, over 30 games, Frogger, Pacman, Asteroids, etc. Good condition, magazines etc. Worth £200, bargain at £85. Ideal Xmas present. Tel: 0373 822504.

HARDLY USED 48K software games for sale all going cheap will post for 50p extra charge ring: Kings Langley 67392 for details. Games include Black Crystal, 3D Tank etc.

PRINT MONEY with your Spectrum! Unsually generous royalties paid for good Spectrum software. Send cassette and S.A.E. to: Tantek Services, P.O. Box 54, Stevenage, SG2 9DQ. No arcade games please.

PERSONAL CASH flow modelling on 48K Spectrum. Forecast income and expenditure and avoid incurring the wrath of your bank manager. Monthly account statements. £8.50. ANDIC, 17 Gypsy Lane, Marlow, Bucks.

16K ZX-81, with case, power supply leads, good as new. £50 worth of games, including; Frogger, Flight Simulation, Fantasy Games and many more. Fantastic value at £75. Tel: Loxwood 752121.

SPECTRUM 48K with printer, boxed, plus ultraviolet assembler. Tape and books on games and graphics. £140. Emsworth (02434) 71879.

16K SPECTRUM. 'Ski' down mountain avoiding trees collecting money, progressive difficulty, two versions with hi-scores. Play pontoon against Spectrum. Design UDGs. One tape £2. Fossage Software, Fosse Cottage, Nettleton Chippenham.

COSMIC CAPERS exciting game for ZX-81. 99 levels, Angels versus Devils. For 16K machine, £3.95. BCG Systems, 119 Great Mistley, Basildon, Essex.

16K ZX-81 with leads and manual. As good as new, with £20 worth of games cassettes and books. £50 o.n.o. Tel: (01) 802 4647 (evenings).

16K ZX81 good condition, many games, incl 3D Monster Maze, Space Invaders, Pac-Man etc, two book + manual, bargain at £36. Tel: Wok 65578. Working B & W TV incl.

WANTED "DCODER" by P.S.S. (no longer available). A Jaques, 47 Newstead Road, Urmston, Manchester. 061-747 6201.
9422 Sinclair User (Nov '83)

PAGEPRO SYSTEM FOR SPECTRUM 48K. Stores/processes pages of information with many uses. £5.95 from SO Systems(SU), PO Box 24, Hitchin, Herts. SAE for our full catalogue of ZX Utility Software.

SPECTRUM SOFTWARE available for swapping. Over 100 cassettes. Send your game, with name of game you want, on cassette to: Mark Murphy, Windermere, Cherrywood Rd, Loughlinstown, Co Dublin, Eire.

16K ZX-81; Zon X-81; Keyboard; £90 worth of software; 30 hour basic and 15 mags. Good condition worth approx. £200! Offers please. Telephone 0726 2595 after 4.00 pm with offer. James Pearce, 10 Gannet Dr, St. Austell, Cornwall Pl25 3BD. Tel: 0726 2595.

I WOULD LIKE A PEN FRIEND who owns a Spectrum with whom I can exchange programs. Ramon Macia Riu, Torregassa, No 40, Solsona (Lérida), Spain.

48K SPECTRUM (m/c). DEATHWISH: You're a soldier patrolling hostile streets. Terrorist or mother and child? You've got an instant decision, hesitate and you're dead. FROGS IN SPACE: Keep the greedy Superfrogs from bursting through the Rainbow and gobbling up the Earth's gold. MACHINECODE MONITOR: Powerful, full spec. programming tool. £4.99 each including p&p. MERLIN SOFTWARE, 61 Stamfordham Rd, Fenham, Newcastle.

Reach an estimated readership of over 200,000 users per month for as little as £2.00*.

Or if you are starting your own small business advertise in the supermart for only £10.00.

Yes all you have to do is fill in the coupon below including your name, address and/or telephone number and send to: Supermart, Sinclair User, ECC Publications, 196-200 Balls Pond Road, London N1 4AQ.

Maximum 30 words.

Your advert will appear in the earliest possible edition.

Name ....

Address ....

.... Tel: ....

Have you included the fee of £2.00 or £10.00?

***for second hand sales only**

Conditions
The Advertisement Manager reserves the right to alter, reject or suspend an advertisement without assigning any reason. Advertisements are accepted subject to approval of copy and to the right of the Advertisement Manager to alter, reject or cancel any order without explanation. The Proprietors are not liable for any loss from any cause whatever, nor do they accept liability for printers' errors. The Advertisers shall indemnify the Publishers in respect of any claim, cost and expenses arising out of any libellous or malicious matter or untrue statement in any advertisement published for the advertisers, or any infringement of copyright, patent or design therein. The placing of any order will be deemed to be an acceptance of these conditions.

MAIL ORDER PROTECTION SCHEME

Advertisements in this magazine are required to conform to the British Code of Advertising Practice. In respect of mail order advertisements where money is sought in advance of the despatch of goods the Code requires the advertiser to despatch goods within 28 days, unless a longer period is stated. Where goods are returned to an advertiser, undamaged, within 7 days, the purchaser's money must be refunded, plus the cost of returning the goods. The reader should retain evidence of despatch.

If you order goods from mail order advertisements in this magazine and pay in advance of delivery you will be considered for compensation under the Scheme if the advertiser becomes insolvent or ceases to trade provided that:

(a) you have not received the goods, or a refund in respect of returning same, AND:

(b) you write to the Advertisement Manager of this magazine, stating the facts, not earlier than 28 days from the date of the order and NOT LATER THAN THREE MONTHS from the date on which the advertisement appeared.

THE SCHEME ONLY COVERS ADVANCE PAYMENT SENT IN DIRECT RESPONSE TO AN ADVERTISEMENT IN THIS MAGAZINE. IT DOES NOT COVER:—

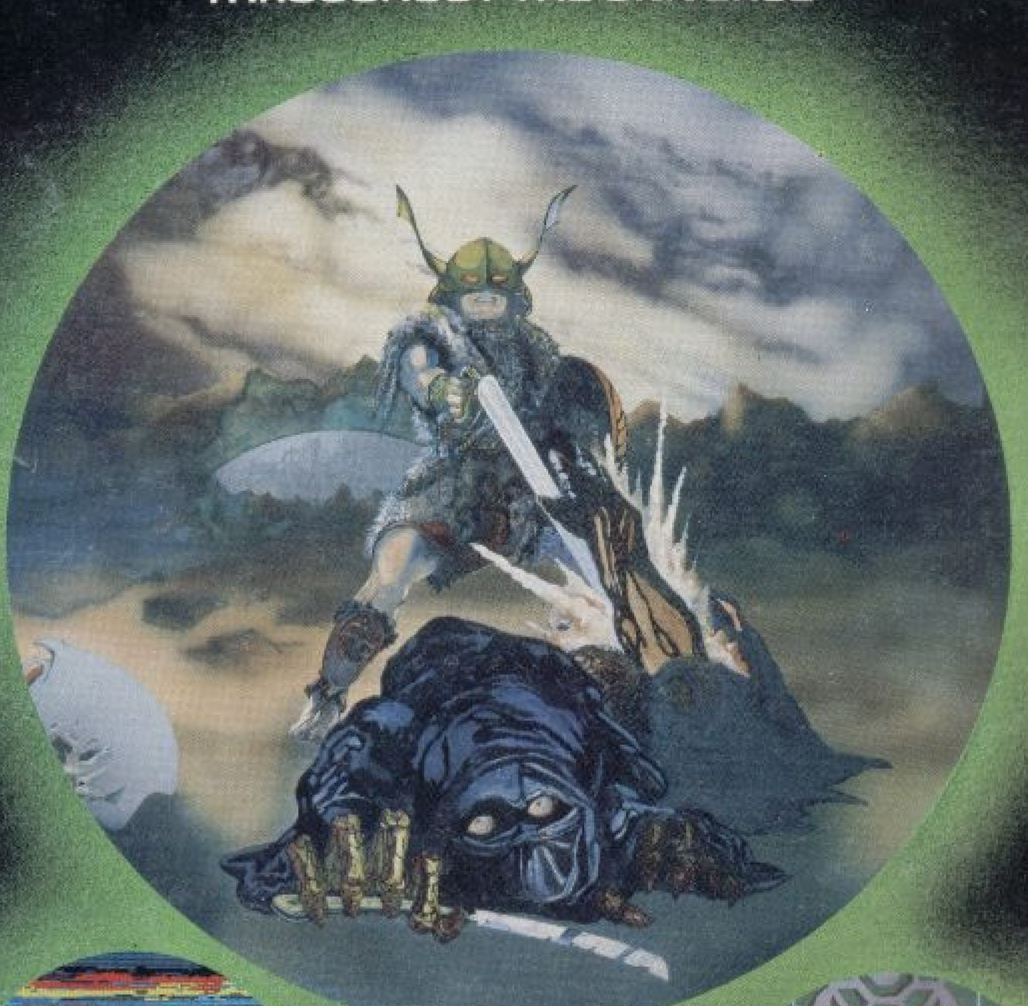
(a) Classified advertising;
(b) payment made in response to catalogues, brochures, etc. received as a result of responding to such advertisements;
(c) advertisers offering services as opposed to goods,
(d) claims where payment is made with Access or Barclaycard and where the cost of the goods is over £30. In this case claims should be made to the Credit Card Company concerned.

Full details of the Scheme are available by sending a stamped and addressed envelope to Mail Order Protection Scheme, Newspaper Publishers Association Limited, 6 Bouverie Street, London EC4Y 8AY.

UNBELIEVABLE SOFTSOLID 3D ANT ATTACK

MADE ON EARTH

SUPPLIED TO SENTIENT BEINGS THROUGHOUT THE UNIVERSE



COMMODORE 64 GAMES

QUINTIC WARRIOR
Stand alone against Sinister Crabmen and Mangled Mutants.
Author: T. P. Watts.

RING OF POWER
Search thru' the kingdom for the mystical ring. Graphics/Text Adventure. Commodre 64.
Authors: Fred Preston & Bob McClemont.



AQUAPLANE
Ski thru' Marine Maniacs but beware the deadly snapping Sharks. Commodore 64 (Joystick or Keyboard).
Designer: John Hollis & Programmer Steve Hickman.

PURPLE TURTLES
Turtle bobbing with the cute Purpilius Turtiliorum. Commodore 64 (Joystick or Keyboard).
Authors: Mark & Richard Moore.





BBC PROGRAMES

MINED-OUT
Save Bill The Worm from Certain Death. BBC model B 32K. (1·0 + 1·2 operating systems only).
Authors: I. Andrew & I. Rowlings.

BEEB-ART
High Quality Art/Design program for versatile manipulation of the BBC's graphics ability. BBC model B 32K.
Author: Dave Mendes.

THE GENERATORS
Superb Character + Teletext Utility. BBC model B 32K.
By the author of Beeb-Art: David Mendes.

SPECTRUM GAMES

VELNOR'S LAIR (Adventure)
Battle of Denizens of the Goblin Labyrinth and the Evil Wizard Velnor. Spectrum 48K.
By Derek Brewster of Neptune Computing.



SMUGGLERS COVE
You are caught in a fable full of horror and Black Beard's Treasure... Spectrum 48K.
Author: John Keneally.

TRAXX
Pilot your way thru' the Grid. Spectrum 48K
Designer: Jeff Minter.

GRIDRUNNER
Spectrum version of VIC 20 No. 1 best seller. Spectrum 48K (16K).
Designer: Jeff Minter.

AQUAPLANE
Aquatic Action! Spectrum 48K.
Author: John Hollis.

XADOM
Battle through a sophisticated alien maze on this Arcade/Adventure. Spectrum 48K.
Author: Mike Muscoff.



3D STRATEGY
A battle of Nerves and Wits. Faster than a speeding bullet! Spectrum 16K.
Author: Freddy Vachha.

BUGABOO (THE FLEA)
No fleas on This Program!! Itchy Action!! Spectrum 48K
Author: Indescomp.



SOFTSOLID 3D ANT ATTACK
Battle the ants in the walled city of Antescher. Spectrum 48K.
Authors: Sandy White

URGENT Join the QUICKSILVA Game Lords Club send for details

QS™ THE GAME LORDS

Quintic Warrior Commodore 64	£7.95	□
Purple Turtles Commodore 64	£7.95	□
Aquaplane Commodore 64	£7.95	□
Ring of Power Commodore 64	£9.95	□
Mined-Out BBC model B 32K	£6.95	□
Beeb-Art BBC model B 32K	£14.95	□
The Generators BBC model B 32K	£6.95	□
Velnor's Lair Spectrum 48K	£6.95	□
Smugglers Cove Spectrum 48K	£6.95	□
Traxx Spectrum 48K	£6.95	□
Gridrunner Spectrum 16K/48K	£6.95	□
Aquaplane Spectrum 48K	£6.95	□
Xadom Spectrum 48K	£6.95	□
3D Strategy Spectrum 16K	£6.95	□
BugaBoo (The Flea) Spectrum 48K	£6.95	□
Softsolid 3D Ant Attack Spectrum 48K	£6.95	□

Please send order to
QUICKSILVA MAIL ORDER: 55 Haviland Road Ferndown Industrial Estate Wimborne, Dorset

PLEASE SEND ME THE GAMES AS TICKED SUPPLIED ON CASSETTE

Total cheque/P.O. enclosed ________

Cheque payable to Quicksilva Limited

NAME ________

ADDRESS ________

Send S.A.E. for Catalogue. QS Games are available through Boots, J. Menzies, Smiths, Hamleys, and all leading computer stores.

CREDIT CARD TELE SALES: 0202-891744

WARNING: These programs are sold according to QUICKSILVA Ltd's terms of trade and conditions of sale. Copies of which are available on request.

HEAD OFFICE: QUICKSILVA LIMITED, PALMERSTON PARK HOUSE, 13 PALMERSTON ROAD, SOUTHAMPTON SO1 1LL